IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TQ DELTA, LLC, Plaintiff, v. ZYXEL COMMUNICATIONS, INC. and ZYXEL COMMUNICATIONS CORPORATION, Defendants.	Civil Action No. 13-cv-2013-RGA
TQ DELTA, LLC, Plaintiff, v. ADTRAN, INC. Defendant.	Civil Action No. 14-cv-954-RGA
ADTRAN, INC, Plaintiff, v. TQ DELTA, LLC. Defendant.	Civil Action No. 15-cv-121-RGA

JOINT CLAIM CONSTRUCTION BRIEF FOR THE FAMILY 7 PATENTS

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I. INTRODUCTION

A. Plaintiff's Opening Position

Pursuant to the Third Scheduling Order, Plaintiff TQ Delta, LLC. ("TQD") submits its Opening Claim Construction Brief for the Family 7 Patents, which include TQD's U.S. Patent Nos. 6,445,730 (the "730 patent"), 7,978,753 (the "753 patent"), 8,437,382 (the "382 patent"), and 8,611,404 (the "404 patent").[1]

TQD submits that its proposed constructions are supported by the claim language, intrinsic record, and extrinsic evidence and should, therefore, be adopted by the Court. In contrast, Defendants' proposed constructions rewrite the claims to import additional limitations or, in some instances, to render the scope of the claim ambiguous. Further, Defendants' assertions that certain claim terms are indefinite are unfounded.

B. Defendants' Answering Position

The Family 7 patents[2] relate to transceivers with low power mode or sleep mode capabilities. The intrinsic evidence discloses that in both modes the circuitry is not transmitting or receiving content, i.e., data. The only disclosure where data is transmitted is "benign idle data" and is specifically stated in the respective claims. Defendants' constructions rely on the intrinsic evidence provided in the Family 7 patents and are consistent with the understanding of

[1] The Family 7 Patents share a common specification. Reference to the "specification" infra will be understood to be a reference to the common specification of all four Family 7 Patents, but cites will be to a specific patent in the family.

[2] The "Family 7" patents are U.S. Patent Nos. 6,445,730 ("the '730 patent"), 7,978,753 (the '753 patent"), 8,437,382 ("the '382 patent"), and 8,611,404 ("the '404 patent"). The four patents in Family 7 share a common specification. The '404 patent is only asserted against Defendant ADTRAN. All citations are to the '730 patent unless otherwise noted.

a person of ordinary skill in the art (POSA). Plaintiff's constructions attempt to encompass embodiments not disclosed in the specification and misquote the disclosure.

II. BACKGROUND OF THE FAMILY 7 PATENT TECHNOLOGY

A. Plaintiff's Opening Position

The Family 7 (or "Low Power Mode") Patents are all entitled "Multicarrier Transmission System with Low Power Sleep Mode and Rapid-On Capability" and all describe inventive techniques for improving a transceiver that transmits and receives multicarrier signals by allowing the transceiver to enter a low power mode from a full power mode and to rapidly exit the low power mode at some later time. *See* A465 (Chrissan Decl.) at ¶ 19. More particularly, embodiments of the invention allow a multicarrier transceiver to rapidly exit the low power mode and return to full data transmission capabilities without needing to go through the time-consuming process of initializing the transceiver. This may be accomplished by maintaining synchronization and/or storing full power mode transmission parameters while in the low power mode. *See* A468 (Chrissan Decl.) at ¶ 26.

"Multicarrier transmission systems provide high speed data links between communication points." *See* A40 (404 patent) at 1:37-38; A465 (Chrissan Decl.) at ¶ 20. A digital subscriber loop ("DSL") system is an exemplary multicarrier transmission system that is used to provide high-speed data communication over the same local subscriber loop that is used to provide telephone service to a subscriber. *See* A40 (404 patent) at 1:38-44;[3] A465 (Chrissan Decl.) at ¶ 20.

[3] "Such systems have recently been introduced for communications over the local subscriber loop that connects a telephone service subscriber to a central telephone office; in this important application they are commonly referred to as 'xDSL' systems, where the 'x' specifies a particular variant of DSL (digital subscriber loop) communications . . . ."

In a DSL system, the overall communication bandwidth of the communication channel between the subscriber and the central office is divided into a number of separate sub-channels or carriers, *e.g.*, 256 sub-channels. *See* A40 (404 patent) at 1:48-55;[4] A465 (Chrissan Decl.) at ¶ 20. A multicarrier transceiver divides data to be transmitted into groups of bits, allocates each group of bits to a sub-channel, and modulates each group of bits onto its respective sub-channel. *See* A40 (404 patent) at 1:63-66;[5] A465-66 (Chrissan Decl.) at ¶ 20. The number of bits allocated to a particular sub-channel (*i.e.*, the "bit allocation") may range from, for example, zero to 15 bits depending on a number of factors, including, for example, received signal strength and noise on the particular sub-channel, desired data rate, and other factors. A466 (Chrissan Decl.) at ¶ 20.[6]

Prior to exchanging data over a communication channel via transmission of multicarrier signals, a pair of transceivers (*e.g.*, a central office transceiver in communication with a customer premise transceiver) in a DSL system go through an initialization process that includes several distinct phases. *See* A41 (404 patent) at 3:7-9;[7] A466 (Chrissan Decl.) at ¶ 21. The first phase involves synchronizing the timing references of the transceivers. A466 (Chrissan Decl.) at ¶ 21.

[4] "In such systems, a pair of transceivers communicate[s] with [each] other by dividing the overall bandwidth of the channel interconnecting the subscriber and the central office into a large number of separate subchannels, each of limited bandwidth, operating in parallel with each other. For example, one common system divides the subscriber line channel into two hundred and fifty six subchannels, each of 4.3 kilohertz bandwidth."

[5] "Data to be communicated over the link is divided into groups of bits, one group for each sub channel. The group of bits allocated to a given subchannel is modulated onto a carrier whose frequency is specific to that channel."

[6] The fundamentals of multicarrier communications are discussed in greater detail in TQD's briefing with respect to the Family 1 Patents. Those specific details are not necessary for resolving the parties' claim construction disputes with respect to the Family 7 Patents.

[7] "Because of the complexity of DSL transceivers, and the conditions under which they must operate, it is necessary to initialize them prior to the transmission and reception of data."

The next phase involves the transceivers determining electronic characteristics of the wire loop (*i.e.*, a twisted copper wire pair or, more colloquially, a phone line) connecting the transceivers. Such electronic characteristics are sometimes referred to as "loop characteristics." A466-67 (Chrissan Decl.) at ¶ 22. Loop characteristics are functions of different physical characteristics of the wire loop, such as the length, diameter, and composition. *Id*. Once the loop characteristics are determined, the initialization process continues with a sub-channel characterization and analysis phase. During this phase, sub-channel characterization information, such as signal to noise ratios ("SNR"), is determined on a sub-channel basis. SNR is a function of loop characteristics such as noise levels and attenuation. A467 (Chrissan Decl.) at ¶ 23.

In the last phase of initialization, the sub-channel characterization information is used to determine parameters that are used for data transmission. *See id.* at ¶ 23. Examples of transmission parameters include transmission and reception data rates, fine gain parameters, and bit allocation parameters. *See id.*; A41 (404 patent) at 3:10-20.[8] Transmission parameters are specific to and conform to the communication protocol used for data transmission. A467 (Chrissan Decl.) at ¶ 23. The transceivers then go through the step of exchanging the transmission parameters. *Id.*

When initialization is finished, the transceivers can start exchanging data using the transmission parameters. A467 (Chrissan Decl.) at ¶ 24. In the context of DSL, data is sent in

[8] "This initialization includes, inter alia, channel corrections such as 'training' the frequency-domain and time-domain equalizers and the echo cancellers; setting the channel gains; negotiating the transmission and reception data rates; adjusting the fine gains on the sub channels over which communication is to take place; setting the coding parameters; and the like. Additionally, it includes measuring the signal-to-noise ratio of each of the subchannels, calculating the bit-allocation tables characteristic of each under given conditions of transmission, and exchanging these tables with other modems with which a given modem communicates."

superframes. A superframe includes a number of data frames (*e.g.*, 68 data frames) and a synchronization symbol or frame. *Id*. The transceivers count the received frames and may use their respective timing references to synchronize their respective frame counters. *See id.*; A42 (404 patent) at 5:50–52 ("This also synchronizes frame counter 34 of the CPE transceiver to the corresponding frame counter of the CO transceiver."). A transceiver may use the received synchronization frame to identify the boundaries of the superframes. A467 (Chrissan Decl.) at ¶ 24.

B. Defendants' Answering Position

Defendants generally agree with Plaintiff's statements, including the admission that "the invention allow[s] a multicarrier transceiver to rapidly exit the low power mode and *return to full data transmission capabilities without needing to go through the time-consuming process of initializing the transceiver*." *Supra*. at 2 (emphasis added). Defendants disagree with Plaintiff's Background in at least two respects that bear note. First, Defendants disagree with Plaintiff's treatment of the terms "low power mode" and "sleep mode" as synonymous. The plain and ordinary meaning of "low power mode" and "sleep mode" would have been different to a POSA at the time of the alleged invention. A497 (Heegard Decl.) at ¶ 23. Nothing in the intrinsic record overrides that understanding to dictate they should be treated identically. Defendants also disagree with Plaintiff's assertion that the invention improved existing transceivers, (II.A. at 2), as low power mode and sleep mode functionalities were implemented in telecommunications devices well before the Family 7 patents were filed, and are not novel. A494-95 (Heegard Decl.) at ¶¶ 17–18.

C. Plaintiff's Reply Position

Defendants "generally agree" with TQD's statements regarding the background of the Family 7 Patent technology, with two exceptions. Defendants contend that the terms "sleep

mode" and "low power mode" have different meanings. As discussed in more detail below, that simply is not the case. Indeed, Defendants never provide any kind of credible explanation as to why these terms should be construed differently, and they rely heavily on conclusory, unsupported testimony by their expert to support their position. Defendants also contend that the claimed inventions of the Family 7 Patents did not improve upon existing transceivers because low power/sleep modes were known in the prior art. Of course, the novelty of a claim is not based on just one element of the claims but on the claimed invention as a whole. Moreover, seeing that the United States Patent Office issued all four of the Family 7 Patents (which are all based on the same specification), it is safe to say that the Patent Office has repeatedly disagreed with Defendants' contention that the specification does not disclose inventive transceivers.

III. SUMMARY OF THE FAMILY 7 PATENTS

A. Plaintiff's Opening Position

The Family 7 Patents claim significant improvements to prior art multicarrier transceiver devices and systems used for data communication. *See* A467 (Chrissan Decl.) at at ¶ 25. Prior art multicarrier transceivers were commonly maintained in the "on" state because of their complexity and the fact that they had to remain ready to immediately transmit or receive data. *See id.*; A40 (404 patent) at 2:55-58.[9] In this "on" state, both the transmitter and receiver portions of a prior art transceiver remained fully operational (transmitting and receiving "idle" or effectively empty, data frames) at all times even when a transceiver did not have any data to transmit or receive. As a result, the multicarrier transceivers wasted a significant amount of

[9] "Because of their extensive use in Internet communications as well as in other applications, DSL transceivers are commonly maintained in the 'on' state, ready to transmit or receive once they have been installed and initialized."

power and had short life spans. *See* A40 (404 patent) at 2:59-63;[10] A468 (Chrissan Decl.) at ¶ 25.

Although low power modes (in which data communications are temporarily suspended) were known in the prior art, they were unsatisfactory because, after exiting the low power mode, the transceivers still had to go through a lengthy re-initialization process to determine parameters necessary for full data transmission. A468 (Chrissan Decl.) at ¶ 25. The re-initialization process could take, for example, "tens of seconds." This was unacceptable because users typically desired near-instantaneous response for data communications. *See id*.; A41 (404 patent) at 3:23-30.[11]

The Family Seven Patents overcame these problems by teaching transceivers that save energy by operating in a low power (or sleep) mode when not needed to transmit or receive data, but that can go rapidly from the low power mode back to a full power mode, without having to go through re-initialization, when needed to transmit or receive data. *See* A468 (Chrissan Decl.) at ¶ 26. The inventive framework for rapid-on capability includes maintaining synchronization between first and second transceivers[12] by transmitting or receiving a synchronization signal

[10] "[S]uch modems consume a significant amount of power, even when they are not actively transmitting or receiving data. It is generally desirable to limit this power consumption, both for environmental reasons as well as to prolong the life of the equipment."

[11] "These procedures can require from seconds to tens of seconds. In a new installation, the time required is inconsequential. However, in an already-operating installation, the time required to initialize or re-initialize the system after a suspension of operation in connection with power conservation is generally unacceptable, since it is typically desired to have the modem respond to request for service nearly instantaneously."

[12] The examples of first and second DSL transceivers provided in the specification include a "central telephone office" (or "CO") transceiver and a "customer premises" (or "CPE") transceiver. *See* A41 (404 patent) at 3:62-67 ("[T]he present invention will be described in the context of an ADSL system having a first transceiver located at the site of a customer's premises (referred to hereinafter as the 'CPE transceiver') and a second transceiver located at a local

while in the low power mode and storing, while in the low power mode, parameters used for the transmission and/or reception of data in full power mode (such as fine gain or bit allocation parameters). *See id*.; A43 (404 patent) at 7:13-15;[13] A42 (404 patent) at 6:65-7:2.[14] By maintaining synchronization and storing transmission parameters in the low power mode, the claimed multicarrier transceiver can rapidly emerge from the low power mode and resume full data transmission/reception immediately in the full power mode without the necessity of performing the time-consuming steps of re-initialization. *See* A468 (Chrissan Decl.) at ¶ 26; A43 (404 patent) at 7:64-8:13.[15]

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central telephone office (hereinafter referred to as the 'CO transceiver').''). The transceiver shown in Figure 1 of the specification represents the CPE transceiver. *See id*. at 4:11-13 ("[S]ince the CPE transceiver and CO transceiver are very similar, the invention will be explained in connection with a detailed illustration of the CPE transceiver only."). While Figure 1 illustrates an embodiment of a CPE device, because the CO transceiver and CPE transceiver are similar in some ways (*id.* at 4:11-13), the specification also references Figure 1 in describing aspects of a CO transceiver, while noting relevant differences. *See, e.g.*, *id*. at 4:58-63 ("A Clock 30 controls the timing of the operation of the transmitter 12. It supplies input to a Controller 32 which controls the individual units of the transmitter. In the case of the CO transceiver, the clock 30 typically is a master clock to which a remote transceiver, such as at a subscriber premises, will be synchronized."). Figure 2 shows steps taken by each of the CPE and CO to enter into and come out of a sleep mode, but the specification explains that the positions of the CO and CPE transceivers in Figure 2 can also be reversed. *See* A43 at 8:36-42 ("[I]nstead of initiating sleep mode at the CPE transceiver as shown in FIG. 2, the CO transceiver may initiate sleep mode. In such a case, the flow of notifications will be as shown in FIG. 2, but with the positions of CO and CPE transceivers reversed.").

[13] "In order to maintain synchronization during the power down or idle state, the CO transceiver continues to transmit to the CPE transceiver the synchronizing pilot tone *62a*."

[14] "The CO transceiver detects this notification; transmits its own 'Entering Sleep Mode' notification (step 88); and enters sleep mode (step 90). In pursuance of this, the CO transceiver stores its state in its own state memory corresponding to the state memory 36 of CPE transceiver 10."

[15] "In response to the 'Awaken' signal, the CPE transceiver retrieves its stored state from the state memory 38; restores full power to its circuitry; and restores the output of the FFT 56 to the input of the PLL 62 (step 96). The CO transceiver, on detecting the 'Exit Sleep Mode' notification from the CPE transceiver (step 99), thereupon exits sleep mode by restoring its state and restoring power. On waking up from sleep mode, the CPE transceiver can begin

B. Defendants' Answering Position

The specifications state that then existing "DSL transceivers are commonly maintained in the 'on' state, ready to transmit or receive once they have been installed and initialized" and that "such modems consume a significant amount of power, even when they are not actively transmitting or receiving data." A5 ('730 patent) at 2:34–39. The specification also states that "in an already-operating installation, the time required to initialize or re-initialize the system after a suspension of operation in is [sic] connection with power conservation is generally unacceptable, since it is typically desired to have the modem respond to request for service nearly instantaneously." A6 ('730 patent) at 3:4–9. That is because initialization or re- initialization requires a number of steps and thus can take up to tens of seconds. A5-6 ('730 patent) at 2:56–3:3.

Against this backdrop, the specification's stated object of the invention is to provide a multicarrier transmission system "having a low power sleep mode and a rapid-on capability," a "multicarrier transmission system for use in digital subscriber line communications that can rapidly switch from a sleep mode to a full-on condition," and a DSL system "having a low power sleep mode and which is capable of rapid return to full operation." A6 ('730 patent) at 3:10–21. Therefore, the Family 7 patents allegedly disclose a method of moving from a low power sleep mode with no data transmission or reception to "full operation" in a short period of time, calling it "rapid-on capability." *See, e.g., id.* at 3:10–21, A7 ('730 patent) at 5:38, 5:52–57, 6:48–52; A495-

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transmitting immediately or after only a few frames delay, since it need not repeat the initialization that was earlier required to establish the requisite parameters (e.g., frequency and time-domain equalizer coefficients (FDQ; TDQ, echo canceller coefficients (ECC), transmitter gains; transmission 10 and reception data rates; transmission and reception coding parameters; transmission fine gains; and Bit Allocation Tables) required for reliable communications. The same is true for the CO transceiver."

96 (Heegard Decl.) at ¶¶ 19–20. TQ Delta also recognizes that no data transmission or reception occurs during a low power sleep mode. I I I . A . at 7 (stating that data communications were suspended in prior art low power modes and that the Family 7 patents teach "a low power (or sleep) mode" that is entered when the transceiver is "not needed to transmit or receive data," and is awakened "when needed to transmit or receive data"). To allow for such "rapid-on" awakening without re-initialization, the transceiver stores its state in state memory when entering the low power sleep mode (*see* A8 ('730 patent) at 7:19–29), and when awakening it restores the state from the state memory (*id.* at 7:51–55), and begins operation "immediately or after only a few frames delay, since it need not repeat the initialization that was earlier required" (*id.* at 7:58–67).

C. Plaintiff's Reply Position

To the extent Defendants suggest that TQD's Summary of the Family 7 Patents somehow supports Defendants' proposed constructions of "low power mode" and "sleep mode," Defendants are incorrect. For the reasons discussed below, Defendants' proposed constructions for those terms are wrong.

IV. ASSERTED CLAIMS

A. Plaintiff's Opening Position

For the convenience of the Court, the Asserted Claims of the Family 7 Patents are set forth below:

404 Patent (Claims 1, 4, 6, and 10)

1. An apparatus comprising a transceiver operable to:

transmit, in a full power mode, a plurality of superframes, wherein the superframe comprises a plurality of data frames followed by a synchronization frame;

transmit, in the full power mode, a synchronization signal;

receive a message to enter into a low power mode;

enter into the low power mode by reducing a power consumption of at least one portion of a transmitter;

store, in the low power mode, at least one parameter associated with the full power mode operation wherein the at least one parameter comprises at least one of a fine gain parameter and a bit allocation parameter;

transmit, in the low power mode, a synchronization signal; and

exit from the low power and restore the full power mode by using the at least one parameter and without needing to reinitialize the transceiver.

4. The apparatus of claim 1, wherein the apparatus is a CO [central office] device that is capable of transmitting internet and video data.

6. An apparatus comprising a transceiver operable to:

receive, in a full power mode, a plurality of superframes, wherein the superframe comprises a plurality of data frames followed by a synchronization frame;

receive, in the full power mode, a synchronization signal;

transmit a message to enter into a low power mode;

store, in a low power mode, at least one parameter associated with the full power mode operation wherein the at least one parameter comprises at least one of a fine gain parameter and a bit allocation parameter;

receive, in the low power mode, a synchronization signal; and

exit from the low power and restore the full power mode by using the at least one parameter and without needing to reinitialize the transceiver.

10. The apparatus of claim 6, wherein the apparatus is a customer premises equipment that is capable of transmitting internet and video data.

730 Patent (Claims 18 and 22)

18. A multicarrier transceiver having a sleep mode capability, comprising:

memory that stores at least one parameter representative of an operating mode of said multicarrier transceiver;

a controller that places at least one component of said multicarrier transceiver in a sleep mode responsive to a sleep mode signal and restores said at least one component of said multicarrier transceiver to the operating mode in response to an awaken signal, the restoration to the operating mode occurring without needing to reinitialize said multicarrier transceiver by recovering said at least one stored parameter from the memory; and

a synchronizer module that uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode.

22. The multicarrier transceiver of claim 18 wherein said at least one parameter comprises at least one of a frequency-domain equalizer coefficient, a time-domain equalizer coefficient, an echo canceller tap, a data rate, a coding parameter, an interleaving parameter, a fine gain parameter, a subchannel gain parameter, and a bit allocation table.

753 Patent (Claims 1 and 2)

1. A multicarrier transceiver having a sleep mode capability, comprising

A. means responsive to a sleep mode command for:

(1) storing selected state parameters characteristic of the communications channel over which the transceiver is operating; and

(2) reducing power to selected portions of transceiver circuitry; and

B. means responsive to a wake-up command for:

(1) restoring power to said transceiver;

(2) restoring the state of said transceiver from said sleep mode by means of said stored parameters; and

C. means for maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates, to thereby facilitate restoration of communication without reinitialization of said transceiver, wherein the state parameters include one or more parameters selected from the group comprising frequency-domain equalizer coefficients, time-domain equalizer coefficients, echo canceller coefficients, bit allocations, coding parameters, fine gains, and subchannel gains.

2. A multicarrier transceiver according to claim 1 in which the means for maintaining said frame count comprises a signal defining a timing reference during at least the time when said first transceiver is in sleep mode.

382 Patent (Claim 14)

14. A multicarrier transceiver having a sleep mode capability comprising:

a transmitter or receiver portion capable of:

placing at least one component of a first multicarrier transceiver in a sleep mode;

storing at least one parameter representative of a full power mode of the at least one component of the first multicarrier transceiver;

maintaining synchronization between the first multicarrier transceiver and a second multicarrier transceiver using a synchronization signal while the at least one component of the first multicarrier transceiver is in the sleep mode;

using the at least one stored parameter, for transmission or reception, in response to a signal to awaken from the sleep mode; and

restoring the at least one component of the first multicarrier transceiver from the sleep mode to the full power mode, without needing to reinitialize the first multicarrier transceiver, by using the at least one recovered parameter, wherein the transceiver is used for communications over an internet.

B. Defendants' Answering Position

Defendants agree with TQ Delta's recitation of the asserted claims from the Family 7 patents.

C. Plaintiff's Reply Position

The Parties are in agreement with respect to the asserted claims of the Family 7 Patents.

V. CLAIM TERMS WITH AGREED UPON CONSTRUCTIONS

A. Plaintiff's Opening Position

The parties have agreed to constructions for certain claim terms from the Asserted Claims of the Family 7 Patents. Those agreed upon constructions are set forth in the table below.

Claim Term	Patent, Claims	Agreed Construction
"wherein said at least one parameter comprises at least one of a frequency domain equalizer coefficient, a time-domain equalizer coefficient, an echo canceller tap, a data rate, a coding parameter, an interleaving parameter, a fine gain parameter, a subchannel gain parameter, and a bit allocation table"	730 patent, claim 22	"wherein said at least one parameter includes a frequency domain equalizer coefficient, a time-domain equalizer coefficient, an echo canceller tap, a data rate, a coding parameter, an interleaving parameter, a fine gain parameter, a subchannel gain parameter, and/or a bit allocation table"
"wherein the at least one parameter comprises at least one of a fine gain parameter and a bit allocation	404 patent, claims 1, 4, 6, 10	"wherein the at least one parameter includes a fine gain parameter and/or a bit allocation parameter"

parameter"		
"multicarrier"	730 patent, claims 18, 22 753 patent, claim 1, 2 382 patent, claim 14	"having multiple carrier signals that are combined to produce a transmission signal"
"store in a low power mode, at least one parameter"	404 patent, claims 1, 4, 6, 10	"maintain in memory, while in low power mode, at least one parameter"
"synchronization frame"	404 patent, claims 1, 4, 6, 10	"a frame that indicates a superframe boundary"
"transceiver" [16]	730 patent, claims 18, 22 753 patent, claims 1, 2 382 patent, claims 14 404 patent, claims 1, 4, 6, 10	The Parties agree to be bound by the Court's construction of "transceiver" in Family 1.

B. Defendants' Answering Position

Defendants agree with TQ Delta's representation of the agreed constructions.

C. Plaintiff's Reply Position

The Parties are in agreement with respect to the representation of the agreed upon constructions.[17]

[16] Defendants have proposed that "transceiver" should be construed as "communications device capable of transmitting and receiving data" based on at least the following intrinsic evidence: see, e.g., Exh. B ('730 patent), at 1:15–16; 1:26–30; 2:34–39; 3:41–51; 3:61–4:2; FIG. 2. Defendants agree to be bound by the Court's construction of "transceiver" in Family 1 solely for purposes of streamlining the case and reserve the right to appeal the construction of "transceiver" as construed in Family 1.

[17] TQD has proposed that "transceiver" should be construed to mean a "communication device capable of transmitting and receiving data wherein the transmitter portion and receiver portion share at least some common circuitry." That construction is based on at least the following intrinsic evidence: 404 patent at Fig. 1 (A36); 4:14-17 (A41), 6:1-6 (A42), 7:15-20 (A43), 7:33-42 (A43). TQD agrees that the Court's construction of "transceiver" in the Family 1 Patents

VI. DISPUTED CLAIM TERMS

A. "low power mode" (recited in the asserted claims of the 404 patent)

Plaintiff's Proposed Construction	ADTRAN's Proposed Construction[18]
"*a state of operation in which power is consumed, but the amount of power consumed is less than when operating in a state with full data transmission capabilities*"	"*a mode in which the circuitry is not transmitting or receiving content and the amount of power consumed by the circuitry is less than full power mode*"

1. Plaintiff's Opening Position

This Court has previously adopted TQD's proposed construction for this term. *See* A61-63, A80 (*TQ Delta, LLC v. Comcast Cable Communications, LLC*, 15-cv-00611-RGA, D.I. 214 (the "MoCA suit") (November 30, 2016)).[19] That previously adopted construction is the correct one.

TQD's proposed construction is consistent with the plain language of the term, which indicates that a lower amount of power is consumed in the mode. It is also consistent with the specification. The specification explains that transceivers in the "on" state "consume a significant amount of power, even when they are not actively transmitting or receiving data." A40 (404 patent) at 2:59-60. This "on" state (or full power mode) is a state where the transceiver has "full data transmission capabilities." A43 (404 patent) at 8:22; A469 (Chrissan Decl.) at ¶ 27. The specification further explains that, when a transceiver is in low power

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applies to the term "transceiver" as used in the Family 7 Patents. TQD reserves the right to challenge the Court's construction of "transceiver" on appeal as to Patent Families 1-10.

[18] "Low power mode" is recited in only the asserted claims of the 404 patent, and the 404 patent is being asserted against only Defendant ADTRAN, Inc.

[19] The 404 patent is at issue in the MoCA suit, but the 382, 730, and 753 patents are not.

mode,[20] power is maintained to circuitry necessary to maintain synchronization with a remote transceiver. *See* A43 (404 patent) at 7:21-25,[21] 7:42-44.[22] In addition, asserted claims 1 and 6 of the 404 patent recite transmitting or receiving "in the low power mode, a synchronization signal," which necessarily means that the claimed transceiver is still consuming some power in the low power mode. *See* A44 (404 patent) at 10:14, 10:39; A469 (Chrissan Decl.) at ¶ 28.

As such, it is clear from the claim language and the specification that, during a low power mode, less power is consumed than in a full power mode but power is still being consumed. Accordingly, TQD's proposed construction that "low power mode" means "a state of operation in which power is consumed, but the amount of power consumed is less than when operating in a state with full data transmission capabilities" is naturally aligned with the patent's description and should be adopted. *See* A469 (Chrissan Decl.) at ¶ 29; *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998) (stating that a "construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction").

In its proposed construction, Defendant ADTRAN agrees that power consumption is reduced, but the construction is still flawed in at least two ways. First, it could be interpreted to read on a state in which the transceiver is turned "off." However, the plain language of the claim

[20] The specification of the Family 7 Patents does not use the exact phrase "low power mode," but it does refer to a "sleep mode" (*see* A40-44 (404 patent), *passim*) and a "low power sleep mode" (*see* A34 at Title, A41 at 3:32, 3:40), which are example embodiments of a low power mode. As such, the meaning of the claim term "low power mode" is evaluated in view of the description of the "sleep mode" and "low power sleep mode" in the specification.

[21] "Power will be maintained, of course, to at least that portion of the analog driver circuitry which transmits the pilot tone and other control signals to the CPE transceiver, and to line circuits required to monitor the line 14 for signals from the CPE."

[22] "The phase and frequency offset of the phase-locked loop 62 is maintained by continued operation of the loop."

term indicates that the mode is a "low power" mode, not a "no power" mode. Furthermore, as discussed above, the specification and surrounding claim language make it clear that the transceiver must be consuming some power to maintain synchronization with a remote transceiver. Also, the specification repeatedly refers to consuming reduced power, not to the complete absence of power consumption. *See, e.g.*, A40 (404 patent) at 2:60–61 ("It is generally desirable to limit . . . power consumption . . . ."); A42 (404 patent) at 6:1–5 ("It is thus desirable that the transceiver be able to suspend operations and enter a 'sleep' mode in which it consumes reduced power when it is not needed for data transmission or reception . . . ."); A469 (Chrissan Decl.) at ¶ 30.

Second, by reading the requirement that "the circuitry is not transmitting or receiving content" into its construction, ADTRAN imports a limitation from one of several embodiments disclosed in the specification. The specification describes multiple ways in which lower power consumption for a transceiver might be achieved, *e.g.*, putting the receiver in a sleep mode while keeping the transmitter in full power mode, *see* A43 (404 patent) at 8:47-55,[23] entering a sleep mode when the transceiver is not needed for data transmission or reception, *see* A42 (404 patent) at 6:1-4,[24] reducing the power supplied to certain circuitry, *see* A43 (404 patent) at 7:21,[25] or rendering dormant certain components. *See* A42 (404 patent) at 5:54–54.[26]

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[23] "It should also be understood that it is possible, and in various circumstances may be desirable, to operate in a 'partial' sleep mode, in which only part of each transceiver is 50 powered down. For example, where data transfer is one-way (when, for example, receiving video at the CPE transceiver from the CO transceiver without any upstream data being sent in return to the CO), the CO receiver and the CPE transmitter may operate in the sleep mode, while the CO transmitter and 55 the CPE receiver are operating in full power mode."

[24] "It is thus desirable that the transceiver be able to suspend operations and enter a 'sleep' mode in which it consumes reduced power when it is not needed for data transmission or reception . . . ."

Thus, the claimed low power mode is not limited to a situation where circuitry is not transmitting or receiving content, and Defendants' attempt to rewrite the claims to include such a limitation is improper. *See Electro Med. Sys., S.A. v. Cooper Life Scis.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994) (noting that "[c]laims are not to be interpreted by adding limitations appearing only in the specification," and that "although the specifications may well indicate that certain embodiments are preferred, particular embodiments appearing in a specification will not be read into the claims when the claim language is broader than such embodiments"); A469 (Chrissan Decl.) at ¶ 30.

Moreover, ADTRAN's inclusion of the word "content" in its construction injects ambiguity into the claim term. *See* A469 (Chrissan Decl.) at ¶ 30. The specification does not use the word "content" anywhere, and ADTRAN's proposed construction does not shed any light on the scope or meaning of the term "content." As such, the addition of the word "content" is superfluous and confusing, and, for this additional reason, ADTRAN's proposed construction should be rejected. *See Source Vagabond Sys. Ltd. v. Hydrapak, Inc.*, 753 F.3d 1291, 1299 (Fed. Cir. 2014) ("Instead of looking to the words themselves, Source added language without support from the specification or prosecution history, altering otherwise unambiguous claim language, a practice this court has repeatedly rejected.") (emphasis added); *Beverage Dispensing Solutions, LLC v. Coca-Cola Co.*, No. 1:14-CV-00220, 2014 U.S. Dist. LEXIS 186362, at *14 (N.D. Ga. Dec. 18, 2014) ("[T]he words 'residential' and 'conventional' only add vagueness to the word 'appliance.' This construction would take a commonly understood word and open it up to disputes about the meaning of 'conventional' and 'residential.'").

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[25] "Further, [the CO transceiver] may reduce power to parts of the analog circuitry."

[26] "In the sleep mode, the FFT 56 is preferably dormant."

2. ADTRAN's Answering Position

a) ADTRAN Is Not Bound By The Previous Claim Construction

While Plaintiff asks the Court to adopt the construction it gave to this term in the MoCA cases,[27] ADTRAN cannot be bound to that construction as it was not a party to those cases and presents arguments not previously considered. *See KX Indus., L.P. v. PUR Water Purification Prods., Inc.*, 108 F. Supp. 2d 380, 387 (D. Del. 2000), *aff'd sub nom.*, 18 F. App'x 871 (Fed. Cir. 2001); *Monec Holding AG v. Motorola Mobility, Inc.*, No. CV 11-798-LPS-SRF, 2013 WL 12218320, at *4 (D. Del. June 11, 2013) ("A prior claim construction has no binding or preclusive effect in this court, particularly where, as here, the defendants were not parties to the earlier action."). ADTRAN was not a party in the MoCA cases, is not in privity with any of the MoCA defendants and had no control or involvement with the claim construction process in the MoCA cases. Further, in the MoCA cases, whether the transceiver is or is not transmitting or receiving content during the low power mode was not raised by any of the parties, and thus not considered by the Court during the MoCA cases. Because ADTRAN was not a party to those proceedings and its construction raises a new issue that was not previously considered by the Court, the Court should accord little deference to its prior construction.

b) ADTRAN's Construction is Supported by the Intrinsic Evidence

There are two primary disputes on low power mode: 1) how to characterize the power reduction in low power mode and 2) whether the circuitry of the transceiver is transmitting or

[27] TQ Delta filed suit against various defendants in cases 15-cv-00611 through 15-cv-00616, accusing them of infringing several patents (including the Family 7 '404 patent) by practicing certain "Multimedia over Coax Alliance" standards (the "MoCA cases"). The Court's November 30, 2016 Memorandum Opinion on claim construction in the MoCA cases (the "MoCA Opinion") is at pages A47–A77 of the Joint Appendix.

receiving content in low power mode. On both points, ADTRAN's proposed construction is correct in light of the intrinsic record.

(1) "the amount of power consumed by the circuitry is less than full power mode"

With regard to the power reduction aspect of the term, ADTRAN's construction is fully consistent with the intrinsic evidence. ADTRAN agrees with Plaintiff's proposal and adopts the Court's prior construction to the extent that the amount of power consumed is less in low power mode. The parties disagree, however, as to the baseline for the reduction of power. As a point of comparison for the reduction in power, ADTRAN's construction refers to "full power mode" rather than "a state with full data transmission capabilities." "Full power mode" is drawn directly from the claims' comparison of a "low power mode" and "full power mode." A44 ('404 patent) at 10:2–18, 10:29–43; A502 (Heegard Decl.) at ¶ 34. The Court should adopt ADTRAN's construction on this point as it aligns most fully with the remaining language of the claim. *Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1369–70 (Fed. Cir. 2005) ("To properly construe a claim term, a court first considers the intrinsic evidence, starting with the language of the claims.").

Contrary to Plaintiff's suggestion, ADTRAN's construction does not encompass a state in which the transceiver is "turned 'off.'" *Supra* at 16. ADTRAN has not and does not argue that it does, nor does Plaintiff provide any evidence that a person of skill in the art would understand ADTRAN's construction in that way. Plaintiff's criticism is doubly confusing as the same argument could be leveled against its (and the Court's prior) construction. If "power consumed by the circuitry is less than full power mode" should be understood to encompass a "'no power mode,'" *id.*, then "power consumed is less than when operating in a state with full data

transmission capabilities" should be understood to encompass the same thing. Plaintiff's criticism provides no reason to distinguish between the two proposals.

(2) "the circuitry is not transmitting or receiving content"

As detailed below, see Section VI.B.2.a, ADTRAN maintains that "low power mode" and "sleep mode" are not identical. The difference is to be found in the degree of power reduction between the two states. A497 (Heegard Decl.) ¶ 23. On the other hand, a universal feature of both "low power mode" and "sleep mode" is that the circuitry of the transceiver is not transmitting or receiving content in either mode.

The specification of the Family 7 patents does not separately mention "low power mode." It refers three times to a "low power sleep mode." *See* A1 & A5 ('730 patent) at Title, A6 ('730 patent) at 3:10–20. Thus, references to "sleep mode" in the specification must be taken as instructive on this aspect of "low power mode." A501 (Heegard Decl.) at ¶ 32.

One of the key features of the claimed "sleep mode" or disclosed "low power sleep mode" is that the circuitry of the transceiver is not transmitting or receiving content in this mode. As stated in the Abstract of the Family 7 patents, the alleged invention is "[a] multicarrier transceiver . . . with a sleep mode in which it idles with reduced power consumption *when it is not needed to transmit or receive [content]*." A1 ('730 patent) at Abstract (emphasis added). Consistent with this description of the alleged invention, Figure 2, which is a "flow diagram of the operation of *the present invention*," also shows that no content is transmitted or received during sleep mode. A6 ('730 patent) at 3:34–35 (emphasis added); *see* A3 ('730 patent) at FIG. 2 (showing that full data communication is resumed (step 106) and transmission is resumed (step 98) upon exiting sleep mode).

The specification also states that "the transceiver of the present invention . . . enter[s] a 'sleep' mode in which it consumes reduced power when it is not needed for data transmission or

reception." A7 ('730 patent) at 5:47–55; *see also* A8 ('730 patent) at 8:8–10 ("In particular, the transceiver of the present invention is capable of recovering full data transmission capabilities within a period of a few frames."). This concept was also described in U.S. Provisional Application No. 60/072,447 ("the '447 provisional"), which the Family 7 patents claim priority to. The '447 provisional states that it is "an object of the invention to provide a multicarrier modem that on awakening from sleep mode, can resume transmission and reception of data." A116 ('447 provisional) at 2. The '447 provisional also states that during the sleep mode "only a pilot tone needs to be generated [therefore] the modulation circuitry can be powered down." A117 ('447 provisional) at 3. These general disclosures and explanations were made regarding the "present invention," and therefore, define the scope of the invention. *See Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1308 (Fed. Cir. 2007) ("When a patent thus describes the features of the 'present invention' as a whole this description limits the scope of the invention."); *Howmedica Osteonics Corp. v. Tranquil Prospects, Ltd.*, 401 F.3d 1367, 1372 (Fed. Cir. 2005) (relying on the abstract and purpose of the invention for construing claims).

Other illustrative embodiments within the specification confirm that the circuitry is not transmitting or receiving content during sleep mode. For example, the specification unequivocally states that the transceiver "ceases transmission" upon entering sleep mode, which a POSA would unmistakably understand to mean that content is not transmitted or received when in sleep mode. A8 ('730 patent) at 6:48–57; *see also* A498-501- (Heegard Decl.) at ¶¶ 25–31.

Plaintiff's argument that "ADTRAN imports a limitation from one of several embodiments disclosed in the specification," *supra* at 17, is unavailing in these circumstances. First, the no transmission or reception of content limitation is described not just in terms of illustrative embodiments, but also in the context of "the present invention." Moreover, where, as

here, the specification describes an integral feature of the invention and repeatedly describes that feature as part of every disclosed embodiment, it is proper to read the claims to include that feature. *See, e.g.*, *Virnetx, Inc. v. Cisco Systems, Inc*., 767 F.3d 1308, 1317–19 (Fed. Cir. 2014) (construing "secure communication link" to require anonymity based on the specification touting the feature of anonymity and repeatedly referring to the anonymity feature); *Wi-LAN USA, Inc. v. Ericsson, Inc*., 675 F. App'x 984, 993–94 (Fed. Cir. 2017) (construing "bandwidth" to mean "data transmission resources in a particular time period" where the claim did not contain an explicit restriction to "a particular time" because the specification repeatedly discussed bandwidth with the addition of a time component).

Plaintiff points out that the specification discloses "multiple ways in which lower power consumption for a transceiver might be achieved." *Supra* at 17. True enough, but those portions of the specification do not contradict the no transmitting or receiving content limitation proposed by ADTRAN. Two of them — "reducing the power supplied to certain circuitry" and "rendering dormant certain components" — do not address the issue at all. Instead, they only identify portions of the transceiver that may receive reduced power or be powered down. A third — "entering a sleep mode when the transceiver is not needed for data transmission or reception" — supports ADTRAN's position as it explicitly states that the transceiver "is not needed for data transmission or reception." The fourth describes a "'partial' sleep mode." *Supra* at n.23. To the extent that embodiment describes a "low power mode," at most it suggests that the no transmitting or receiving content limitation might be limited to a single direction.

"Low power mode" should not, however, be understood to import the "partial" embodiment. Not transmitting or receiving content was such a commonly understood aspect of sleep mode that the specification separately defines a "'partial' sleep mode" in which content can

be communicated in a "one-way" mode. See A8 ('730 patent) at 8:34–44. "Partial" is used to modify sleep mode and by explicitly disclosing a separate "partial" sleep mode, the patentee acknowledges that sleep mode, in its normal understanding to a POSA, has no content transmission from or to the circuitry. A500 (Heegard Decl.) at ¶ 30. None of the asserted claims include the modifying term "partial" despite recognizing the difference as shown in the specification. Plaintiff cannot now construe the claims as if "partial" had been included. *See Oak Tech., Inc. v. Int'l Trade Comm'n,* 248 F.3d 1316, 1329 (Fed. Cir. 2001) (holding that even if the alternate embodiment existed in the specification, those "embodiments would not be covered by the language selected by the claim drafter"); *TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008) ("Our precedent is replete with examples of subject matter that is included in the specification, but is not claimed."). Here, the meaning of "low power mode" as a POSA would have understood it cannot be stretched to encompass a "partial low power mode." A500 (Heegard Decl.) at ¶ 30.

Finally, Plaintiff's complaint that the inclusion of "content" introduces ambiguity is confusing. "Content" generally replaces the word "data" in corresponding portions of the specification discussing the transmission or reception of data. *See, e.g.,* A1 ('730 patent) at Abstract ("reduced power consumption when it is not needed to transmit or receive data"). During the MoCA cases, the parties sought a construction for the term "data," and Plaintiff agreed to the Court's construction of "content." A70 (MoCA Op. at 21). In an attempt to avoid disputes here, ADTRAN is employing the Court's already accepted construction. *See infra* n.32. Plaintiff provides no explanation for why "content" was acceptable in MoCA but ambiguous and confusing now.

For the reasons set forth above, the Court should construe "low power mode" to mean "a mode in which the circuitry is not transmitting or receiving content and the amount of power consumed by the circuitry is less than full power mode."

3. Plaintiff's Reply Position

ADTRAN breaks its arguments up in its brief to separately discuss two different portions of its construction. TQD's Reply follows that format.

a) "The Amount of Power Consumed by the Circuitry is Less than Full Power Mode"

ADTRAN first argues that the insertion of "the amount of power consumed by the circuitry is less than full power mode" into its construction is correct because it "is drawn directly from the claims' comparison of a 'low power mode' and 'full power mode.'" *Supra* at 20. But, Defendants' construction is unhelpful. The incorporation of "full power mode" into Defendants' construction does not clarify matters because Defendants do not explain what "full power mode" means. As TQD points out above, the specification explains that, when the transceiver comes out of low power mode, it is "capable of recovering full data transmission capabilities." *See supra* at 15 (citing A43 (404 patent) at 8:22; A469 (Chrissan Decl.) at ¶ 27); *see also* A7 (730 patent) at 5:19 ("During normal (non-sleep mode) operation . . . ."). Thus, in view of this description, the language that more clearly provides a point of comparison for the "low power mode" is that proposed by TQD (and previously adopted by the Court) – "a state with full data transmission capabilities."

Next, ADTRAN argues that its construction does not encompass a state in which the transceiver is turned off. *Supra* at 20. ADTRAN, however, does not explain <u>why</u> its construction – which just says that the power consumed is less than full power mode – would not cover an "off" mode. An "off" mode, *i.e.*, zero power is consumed, <u>is</u> a mode in which the

amount of power consumed is "less than full power mode." *See* A544 (Chrissan Reply Decl.) at ¶ 7. In an attempt to turn the tables, ADTRAN argues that TQD's construction could also encompass a "no power mode" or "off" mode. *Supra* at 20. This one is a head scratcher. TQD's construction is "a state of operation in which power is consumed, but the amount of power consumed is less than when operating in a state with full data transmission." As a "no power mode" or "off mode" would not consume power, TQD's construction – which states that some power is consumed – does not cover such modes. *See* A545-46 (Chrissan Reply Decl.) at ¶ 11.

Accordingly, since ADTRAN apparently agrees that "low power mode" cannot be construed to cover a "no power" or "off" mode, and TQD's construction clearly does not cover such modes, ADTRAN should not have any problem agreeing to TQD's proposed construction.

b) "The Circuitry is not Transmitting or Receiving Content"

(1) ADTRAN's attempt to distinguish "sleep mode" and "low power mode" is untenable

As an introduction to its argument that "low power mode" should be construed to include the language of "a mode in which the circuitry is not transmitting or receiving content," ADTRAN unconvincingly tries to explain why "sleep mode" and "low power mode" have different meanings. In that regard, ADTRAN notes that the specification does not describe a "low power mode," and acknowledges that the references to the "sleep mode" in the specification are "instructive" as to the meaning of "low power mode." *Supra* at 21. Elsewhere, however, ADTRAN asserts that the terms "low power mode" and "sleep mode" are different in "the degree of power reduction between the two states" but similar in not involving the transmitting or receiving of content. *Id*. In other words, ADTRAN relies on the description of the "sleep mode" to construe "low power mode" when it serves a purpose – *i.e.*, to support ADTRAN's (incorrect) contention that the claimed "low power mode" requires that the circuity

not be transmitting or receiving content – but then says the description of the sleep mode is not instructive in construing "low power mode" with respect to power reduction.[28]

(2) The specification does not support ADTRAN's construction

The term "low power mode"[29] should not be construed to include the negative limitation that "the circuitry is not transmitting or receiving content." As an initial matter, ADTRAN's construction ignores the words of the term "low power mode" by trying to define that term with respect to what is or is not transmitted or received, and not with respect to power. In support of its construction, ADTRAN points to sections of the specification that refer to "a sleep mode in which it idles with reduced power consumption when it is not needed to transmit or receive data," the transceiver "enter[ing] a 'sleep' mode in which it consumes reduced power when it's not needed for data transmission or reception," and a transceiver "capable of recovering full data transmission capabilities within a period of a few frames." *Supra* at 21; A1 (730 patent) at Abstract, A7-8 (730 patent) at 5:47-55, 8:8-10; *see also* A116 (447 provisional) at 2. ADTRAN argues that the aforementioned portions of the specification "define the scope of the invention" because they were made regarding the "present invention" and that its construction is based on those descriptions. ADTRAN's argument fails for several reasons.

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[28] ADTRAN cites to the extrinsic evidence of the Heegard Declaration to support its argument that "sleep mode" and "low power mode" are both informed by descriptions of the "sleep mode" in the specification but still have different meanings. *Supra* at 21. Those cited sections of the declaration, however, include conclusory testimony and do not explain why or how a POSA would have understood "low power mode" to be different than "sleep mode." *See* A497, 501 (Heegard Decl.) at ¶¶ 23, 32; A543-44 (Chrissan Reply Decl.) at ¶¶ 5-6; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1318 (Fed. Cir. 2005) ("[C]onclusory, unsupported assertions by experts as to the definition of a claim term are not useful to a court.").

[29] TQD will further address the alleged differences between the claim terms "low power mode" and "sleep mode" below in the "sleep mode" section.

First, statements in a specification that a particular embodiment is the "present invention" are "not always so limiting, such as where the references to a certain limitation as being the 'invention' are not uniform, or where other portions of the intrinsic evidence do not support applying the limitation to the entire patent." *Absolute Software, Inc. v. Stealth Signal, Inc.*, 659 F.3d 1121, 1136 (Fed. Cir. 2011). Here, the specification refers to multiple different embodiments as the "present invention." For example, the specification states that Figure 1 illustrates "a preferred embodiment of the present invention" and that Figure 3 "illustrates still another aspect of the present invention." *See* A41 (404 patent) at 3:45-57. Moreover, ADTRAN admits that the specification discloses "[o]ther illustrative embodiments" besides the ones referred to as the "present invention." *See supra* at 22. As such, the sections referring to the "present invention" do not limit the scope of the claims.

Second, TQD's proposed construction – "a state of operation in which power is consumed, but the amount of power consumed is less than when operating in a state with full data transmission capabilities" – is consistent with, and accounts for, those sections of the specification upon which ADTRAN relies.

Third, as explained above, ADTRAN's requirement that the "low power mode" be a mode in which "the circuitry is not transmitting or receiving content" improperly imports just one of several ways disclosed in the specification for going into a low power mode. *See supra* at 17 (citing A42-43 (404 patent) at 5:54, 6:1-4, 7:21, 8:47-55). In response, the best argument that ADTRAN can muster is that its construction "does not contradict" the specification's disclosure of other ways of going into a sleep mode, *e.g.*, by "reducing the power supplied to certain circuity" and "rendering dormant certain components." *See supra* at 23. That the language ADTRAN reads into its construction does not necessarily contradict other disclosed ways of

going into a low power mode does not mean ADTRAN's construction is correct. Indeed, the claim term "low power mode" is broad enough to encompass more than just the embodiment ADTRAN reads into the claims. *See Resonate Inc. v. Alteon Websystems, Inc.*, 338 F.3d 1360, 1367 (Fed. Cir. 2003) ("[L]imitations may not be read into a claim from a preferred embodiment when the claim language is broader than that embodiment.").

Fourth, ADTRAN's construction of "low power mode" is not compatible with the surrounding claim language. Asserted claim 1 of the 404 patent recites a "transceiver operable to," *inter alia*, "enter into the low power mode by reducing a power consumption of at least one portion of a transmitter." As such, claim 1 specifically covers a situation wherein only the transmitter portion of the transceiver is in the low power mode. *See* A545 (Chrissan Reply Decl.) at ¶ 10. ADTRAN's construction of "low power mode," however, requires no transmission or reception of content and, therefore, does not make sense in the context of claim 1. As such, ADTRAN's construction is wrong.

(3) "Content" should not be read into the limitation

Lastly, ADTRAN's arguments as to why its construction of "low power mode" properly includes the term "content" fall short. In response to TQD's position that the term "content" injects ambiguity into ADTRAN's construction, ADTRAN states that "'[c]ontent' generally replaces the word 'data' in corresponding portions of the specification discussing the transmission or reception of data." *Supra* at 24. This "explanation" does nothing to shed any light on how ADTRAN determined to include "content" in its constructions (indeed, it is not found in the specification or claims), what the term means or covers, or why it should replace the word "data." *See* A544-45 (Chrissan Reply Decl.) at ¶ 8.

ADTRAN argues that its inclusion of "content" is appropriate because TQD agreed to construe the word "data" to mean "content" in the MoCA case. *Supra* at 24. In the MoCA case,

TQD agreed at the *Markman* Hearing that the claim term "data," which was recited in a patent not at issue in this case (U.S. Patent No. 9,094,268), could be construed to mean "content." *See* A70 (MoCA Op.) at 21. Here, the claim term being construed is not "data," but "low power mode." Thus, ADTRAN is essentially arguing that the Court should adopt a construction adopted in another case for a term found in another patent that is not the same as the term at issue here – and without pointing to any other evidence as to why that construction is appropriate in this case. This argument is a bridge too far. *See* A544-45 (Chrissan Reply Decl.) at ¶ 8.[30]

Accordingly, the Court should reject any construction for "low power mode" that includes "content." *See Source Vagabond*, 753 F.3d at 1299 ("Instead of looking to the words themselves, Source added language without support from the specification or prosecution history, altering otherwise unambiguous claim language, a practice this court has repeatedly rejected.");[31] *Beverage Dispensing*, 2014 U.S. Dist. LEXIS 186362, at *14 ("[T]he words 'residential' and 'conventional' only add vagueness to the word 'appliance.' This construction would take a commonly understood word and open it up to disputes about the meaning of 'conventional' and 'residential.'").

4. ADTRAN's Sur-Reply Position

a) "The Amount of Power Consumed by the Circuitry is Less than Full Power Mode"

ADTRAN's use of "full power mode" rather than "when operating in a state with full data transmission capabilities" as the point of comparison for "low power mode" is correct because

[30] For similar reasons, Defendants are wrong in arguing that incorporating "content" into their constructions of "low power mode" and "synchronization signal" is appropriate because the Court construed "data" in the MoCA case to mean "content." *See infra* at n.38 and n.47.

[31] All Plaintiff's emphases added unless otherwise indicated.

that is the comparison drawn in the claims. Plaintiff suggests this construction is unhelpful because "Defendants do not explain what 'full power mode' means." *Supra* at 25.

This is an odd criticism given that Plaintiff has not sought to construe "full power mode" in its other appearances in the claims of the '404 patent. A44 ('404 patent) at 10:2, 10:6, 10:11, 10:16, 10:30, 10:33, 10:36, 10:41. In addition, Plaintiff has proposed a construction that includes "full power mode" for another claim limitation: "at least one parameter representative of a full power mode" as "at least one parameter associated with the transmission and/or reception of data during full power mode." *Infra* at 125. Here, where the claims juxtapose "low power mode" in relation to "full power mode," using the same language that otherwise appears in the claims and in other proposed constructions will avoid confusion.

In addition to introducing confusion through its point of comparison, Plaintiff provides weak intrinsic support for comparing "low power mode" to "a state with full data transmission capabilities" rather than "full power mode." Plaintiff pulls its "full data transmission capabilities" language from column 8, line 22 of the '404 patent. *Supra* at 25 (citing A43 ('404 patent) at 8:22). That portion of the specification, however, relates to quickly resuming transmission through the storage and retrieval of the transceiver's state; it is not defining full power mode. The specification explains that the "present invention enables rapid resumption of transmissions, whether recovering from a power down or from an enforced idle condition." A43 ('404 patent) at 8:14–16. This "rapid resumption" to "full data transmission capabilities" is achieved by the storage and retrieval of the transceiver's state. A42–A43 ('404 patent) at 6:67–7:2, 7:35–36, 7:64–66, 8:3. By storing and retrieving its state, "the CPE transceiver can begin transmitting immediately or after only a few frames delay, since it need not repeat the initialization that was earlier required to establish the requisite parameters." A43 ('404 patent) at 8:4–7. "The same is

true for the CO transceiver." *Id.* at 8:12–13. On the other hand, the specification speaks in terms of restoring full power when discussing the aspect of the claim term at issue—power provision and consumption. *Id.* at 7:66 ("restores full power to its circuitry"), 8:3–4 ("restoring power").

Plaintiff's criticism that ADTRAN's proposed construction would encompass a state in which the transceiver is turned off and no power is consumed, *supra* at 25, is equally unavailing. ADTRAN has disclaimed any such reading. Moreover, claims 1 and 6 make clear that some power will be consumed by the transceiver because the transceiver must either transmit or receive a synchronization signal in the low power mode. To avoid any confusion on the matter, ADTRAN would compromise to specifically recite that power is consumed by adding the bolded language: "a mode in which the circuitry is not transmitting or receiving content and **the circuitry consumes power, but** the amount of power consumed by the circuitry is less than full power mode." ADTRAN reiterates, however, that the inclusion of that language is not necessary to properly understand that aspect of the scope of the claim.

b) "The Circuitry is not Transmitting or Receiving Content"

(1) Low Power Mode and Sleep Mode Are Distinct

Plaintiff continues to assert that "low power mode" and "sleep mode" are identical. However, as discussed below, *infra* at 34, Plaintiff is unable to explain why the two different terms should be given the same meaning, particularly when claims of the Family 7 patents state that "the sleep mode comprises placing said at least one component of said first multicarrier transceiver in a low power mode." *E.g.*, A9 ('730 patent) at 10:24–26. Dr. Heegard provided his opinion that a POSA would understand that the two have different degrees of power reduction. Contrary to Plaintiff's suggestion, Dr. Heegard's declaration is not conclusory and is based on the plain meaning of the words as well as dictionary definition to show the ordinary meaning of

the terms. Based on those, he concluded that while "sleep mode" required a "powered down" circuit with "very small amount of charge," "low power mode" would not require that degree of a reduction in consumption of power. A497-98 (Heegard Decl.) at ¶ 23–24; *see also* A558 (Heegard Sur-Reply Decl.) at ¶ 3.

(2) The Specification Supports ADTRAN's Construction

Plaintiff argues that "ADTRAN's construction ignores the words of the term 'low power mode' by trying to define that term with respect to what it is or is not transmitted or received, and not with respect to power." *Supra* at 27. But "low power mode" can be defined both in terms of power consumption and operations that do or do not occur during the mode, and ADTRAN's construction references both. In contrast, Plaintiff's construction defines "low power mode" solely in relation to "data transmission capabilities." Plaintiff's construction is incorrect because it would allow a transceiver in "low power mode" to have normal data transmission, so long as power consumption is reduced, for example, by reducing power to other circuits unrelated to data transmission or by simply slowing down data transmission or reducing redundancies that are included to account for transmission errors. A558-59 (Heegard Sur- Reply Decl.) at ¶ 4.

With regard to intrinsic support for ADTRAN's position that the circuitry is not transmitting or receiving content in low power mode, ADTRAN incorporates the arguments set forth in Section VI.B.4.b.1 with regard to that aspect of sleep mode.

For the reasons set forth above, the Court should construe "low power mode" to mean "a mode in which the circuitry is not transmitting or receiving content and the amount of power consumed by the circuitry is less than full power mode."

B. "sleep mode" (recited in the asserted claims of the 730, 753, and 382 patents)

Plaintiff's Proposed Construction	Defendants' Proposed Construction[32]
"*a state of operation in which power is consumed, but the amount of power consumed is less than when operating in a state with full data transmission capabilities*"	"*a mode in which the circuitry is not transmitting or receiving content and is* <u>*powered down*</u> ~~*power to the circuitry is reduced for the purpose of power conservation*~~*"*

1. Plaintiff's Opening Position

TQD's proposed construction for "sleep mode" (which is recited in the asserted claims of the 730, 753, and 382 patents) is the same as its construction for "low power mode" (which is recited in the asserted claims of the 404 patent). As discussed above, the construction of the term "low power mode" – a term that does not appear in the specification of the Family 7 Patents – must be informed by the description in the specification of a "sleep mode" and "low power sleep mode." As such, there is no significant discernible difference in the meaning or scope of the claimed "sleep mode" and the claimed "low power mode." Accordingly, for the same reasons provided above with respect to the claim term "low power mode," "sleep mode" should be construed to mean "a state of operation in which power is consumed, but the amount of power consumed is less than when operating in a state with full data transmission capabilities." *See* A470 (Chrissan Decl.) at ¶ 31.

Defendants' proposed construction does not pass muster. To start with, for the same reasons discussed above with respect to ADTRAN's construction of "low power mode," the language regarding "a mode in which the circuitry is not transmitting or receiving content" improperly imports requirements from the specification and injects ambiguity into "sleep mode."

[32] Defendants modify their proposed construction in hopes of further narrowing the disputed issues. The modifications are show with added words underlined and deleted words stricken through. Defendants, however, do not agree that their original proposed construction is not supported by the intrinsic record.

See id. at ¶ 32. Furthermore, Defendants' addition of "for the purpose of power conservation" is improper because it requires a particular purpose for the sleep mode that is not recited in the claim. *See Comark Commc'ns., Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (rejecting construction that would "limit the phrase 'video delay circuit' to its functional purpose as disclosed in the preferred embodiment").

Defendants' construction also improperly reads into "sleep mode" the requirement that "power to the circuitry is reduced." This creates a technical ambiguity because it might be interpreted to require that the amount of power available to be provided to circuitry is reduced as opposed to the amount of power that is being provided to and consumed by the circuitry is reduced. Nothing in the words "sleep mode" requires the former to the exclusion of the latter. Moreover, while the specification refers to reducing power to circuity in describing an embodiment, *see* A8 (730 patent) at 7:4-8,[33] the specification does not state that that reduction is necessarily achieved by reducing the amount of power that is available to be provided to the circuitry. *See* A470 (Chrissan Decl.) at ¶ 32. Indeed, elsewhere, the specification explains that a transceiver "enter[s] a 'sleep' mode in which it consumes reduced power when it is not needed for data transmission or reception," *see* A7 (730 patent) at 5:52-55 (emphasis added), and that a transceiver is "provided with a sleep mode in which it idles with reduced power consumption when it is not needed to transmit or receive data." A1 (730 patent) at Abstract (emphasis added). The specification also describes embodiments where "only part of each transceiver is powered down." A8 (730 patent) at 8:34-37. Again, the specification does not require that such

[33] "[I]t may reduce or cut off power to the digital modulator/demodulator portions of its transmitter and receiver sections (corresponding to the IFFT 20 and FFT 56 of the CPE transceiver, FIG. 1); this provides a significant power reduction."

"powering down" occur only by reducing the amount of power that is available to be supplied to circuitry. Thus, Defendants' construction is potentially confusing and unduly narrow.

Defendants' construction is also incorrect because it could be understood to cover a situation where the transceiver is not consuming any power or is turned off. Again, the specification and surrounding claim language of the Family 7 Patents contemplate that some power is consumed by the transceiver in the sleep mode to maintain synchronization with a remote transceiver. *See* A7-8 (730 patent) at 6:67-7:11;[34] A10 (730 patent) at 11:14-18;[35] A33 (382 patent) at 11:1-3;[36] A21 (753 patent) at 10:5-9;[37] A470 (Chrissan Decl.) at ¶ 32.

2. Defendants' Answering Position

There are two disputes regarding "sleep mode": 1) whether the circuitry is transmitting or receiving content in "sleep mode" and 2) how to describe the transceiver's power consumption in "sleep mode." On both points, Defendants' construction aligns with the specification.

[34] "In order to maintain synchronization during the power down or idle state, the CO transceiver continues to transmit to the CPE transceiver the synchronizing pilot tone *62a*. It may, at this time, perform its own power reduction. . . . Power will be maintained, of course, to at least that portion of the analog driver circuitry which transmits the pilot tone and other control signals to the CPE transceiver, and to line circuits required to monitor the line 14 for signals from the CPE transceiver."

[35] "[A] synchronizer module that uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode . . . ."

[36] "[U]sing a synchronization signal while the at least one component of the first multicarrier transceiver is in the sleep mode . . . ."

[37] "[M]eans for maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates, to thereby facilitate restoration of communication without reinitialization of said transceiver . . . ."

Throughout the specification, sleep mode is defined by two elements: 1) the circuitry is not transmitting or receiving content (i.e., data)[38]; and 2) the circuitry is powered down. Defendants' construction of "sleep mode" as "a mode in which the circuitry is not transmitting or receiving content and powered down" is consistent with the intrinsic evidence for the Family 7 patents. Without intrinsic support, Plaintiff inaccurately equates sleep mode and low power mode. Plaintiff also ignores the consistent fact that the circuitry does not transmit or receive content, i.e., data in sleep mode. In an attempt to win its construction, Plaintiff argues confusion where there is none, so far as the Defendants are using the exact words from the specification and that would be understood by a POSA. Therefore, Defendants' construction of "sleep mode" as "a mode in which the circuitry is not transmitting or receiving content and is powered down" is appropriate.

a) Sleep Mode is Not the Same as Low Power Mode

"Sleep mode" and "low power mode" are different terms that should not be presumed to have identical scope. *See Starhome GmbH v. AT & T Mobility LLC*, 743 F.3d 849, 858 (Fed. Cir. 2014) (stating that different claim terms are presumed to indicate that the claims have different meanings and scope). The specification of the Family 7 patents does not show otherwise, because it refers to a sleep mode and a low power sleep mode, but never refers to a low power mode and thus never indicates that the two terms somehow have the same meaning. *See* A7–9 ('730 patent) at 5:38–46, 5:52–57, 6:48–54, 8:48–54, 9:44. Moreover, a POSA would have

[38] Like ADTRAN, Zhone and ZyXEL also adopted the construction of "data" provided by the Court in the MoCA cases, which was already agreed to by Plaintiff during the MoCA cases, to reduce the number of disputes as Defendants understand that the Court is already burdened by the need to construe an enormous number of claims that are in dispute as a result of the 38 patents asserted by Plaintiffs. *See* A70 (MoCA Memorandum Opinion) at 21. Surprisingly, Plaintiff disagrees and feigns confusion with a construction it previously agreed to.

understood that sleep mode and low power mode referred to different modes in the relevant field. A497, 502 (Heegard Decl.) at ¶ 23, 36.

Plaintiff's contention that sleep mode and low power mode should be construed identically is not supported by the intrinsic record or any extrinsic evidence. *See supra* at 34.

Plaintiff admits that the specification never mentions "lower power mode" but then contends that there is "no significant discernible difference in the meaning or scope" of the two terms without any apparent reason. *Id.* While Defendants agree that certain aspects of "sleep mode" and "low power mode" have overlap, the terms would not have had the identical meaning to a POSA.

Accordingly, the term sleep mode as it appears in the asserted claims of the '730, '753, and '382 patents has a different meaning from the term low power mode as it appears in the asserted claims of the '404 patent. To provide the same construction for low power mode and sleep mode would then make these claims the same. The Court should not apply the same construction to the two terms.

b) Defendants' Construction is Consistent with the Intrinsic Evidence and is the Plain and Ordinary Meaning

(1) "the circuitry is not transmitting or receiving content"

As explained above with respect to low power mode, one of the key features of the claimed "sleep mode" is that the circuitry of the transceiver is not transmitting or receiving content in this mode. As stated in the Abstract of the Family 7 patents, the alleged invention is "[a] multicarrier transceiver…with a sleep mode in which it idles with reduced power consumption *when it is not needed to transmit or receive [content]*." A1 ('730 patent) at Abstract (emphasis added). Consistent with this description of the alleged invention, Figure 2, which is a "flow diagram of the operation of the *present invention*," also shows that no content is transmitted

or received during sleep mode. A6 ('730 patent) at 3:34–35 (emphasis added); *see* A3 ('730 patent) at FIG. 2 (showing that full data communication is resumed (step 106) and transmission is resumed (step 98) upon exiting sleep mode).

The specification also states that "the transceiver of the *present invention* . . . enter[s] a 'sleep' mode in which it consumes reduced power when it is not needed for data transmission or reception." A7 ('730 patent) at 5:47–55; *see also* A8 ('730 patent) at 8:8–10 ("In particular, the transceiver of the present invention is capable of recovering full data transmission capabilities within a period of a few frames."). This concept was also described in U.S. Provisional Application No. 60/072,447 ("the '447 provisional"), which the Family 7 patents claim priority to. The '447 provisional states that "an object of the invention to provide a multicarrier modem that on awakening from sleep mode, can resume transmission and reception of data." A116 ('447 provisional) at 2. The '447 provisional also states that during the sleep mode "only a pilot tone needs to be generated [therefore] the modulation circuitry can be powered down." A117 ('447 provisional) at 3. These general statements and depictions, representative figure, and explanations were made regarding the "present invention," and therefore, define the scope of the invention. *See Verizon Servs.*, 503 F.3d at 1308 ("When a patent thus describes the features of the 'present invention' as a whole this description limits the scope of the invention."); *Howmedica Osteonics*, 401 F.3d at 1372 (relying on the abstract and purpose of the invention for construing claims).

Other illustrative embodiments within the specification confirm that the circuitry is not transmitting or receiving content during sleep mode. The specification unequivocally states that the transceiver "ceases transmission" upon entering sleep mode, which a POSA would

unmistakably understand to mean that content is not transmitted or received when in sleep mode. A8 ('730 patent) at 6:48–57; *see also* A498-501 (Heegard Decl.) at ¶¶ 25–31.

Plaintiff's assertion that Defendants "improperly import[] requirements from the specification" are without merit. *See supra* at 35. First, the no transmission or reception of content limitation is described not just in terms of illustrative embodiments, but also in the context of "the present invention." Moreover, where, as here, the specification describes an integral feature of the invention and repeatedly describes that feature as part of the disclosed embodiments, it is proper to read the claim to require such feature. *See, e.g., Virnetx,* 767 F.3d at 1317–19; *Wi-LAN*, 675 F. App'x at 993–94. Such a construction would be proper as claims must be read in view of the specification. *Virnetx*, 767 F.3d at 1316.

This construction of sleep mode as requiring no transmission or reception of content is also consistent with the plain and ordinary meaning of the term to a POSA. A POSA would have understood that content is not transmitted or received when a device is in sleep mode. A497-98 (Heegard Decl.) at ¶ 24; *see also* A100 (Newton's Telecom Dictionary) at 628 ("Some makers of PCMCI modem cards have included something called 'sleep mode' into their modems. It puts the modems into a power-saving mode when you're not communicating using your modem."). The ordinary meaning of "sleep" would not encompass a situation where content was being communicated, because the transceiver would not be doing anything in that state— including transmitting or receiving content. *See* A497-98 (Heegard Decl.) at ¶ 24; A97 (Microsoft Press® Computer Dictionary) at 320 (defining "sleep" as "[t]o suspend operation without terminating"); A103 (Jargon) at 507 ("defining "sleep" in the context of computers as "not doing anything" and the "hard disk stops spinning"). Thus, the lack of content transmission or reception is consistent

with the plain meaning of sleep mode. Plaintiff's construction erroneously reads out the word "sleep" from sleep mode.

Not transmitting or receiving content was such a commonly understood aspect of sleep mode that the specification separately defines a "'partial' sleep mode" in which content can be communicated in a "one-way" mode. *See* A8 ('730 patent) at 8:34–44. "Partial" is used to modify sleep mode and by explicitly disclosing a separate "partial" sleep mode, the patentee acknowledges that sleep mode, in its normal understanding to a POSA, has no content transmission from or to the circuitry. A500 (Heegard Decl.) at ¶ 30. None of the asserted claims include the modifying term "partial" despite recognizing the difference as shown in the specification. Plaintiff cannot now construe the claims as if "partial" had been included. *See Oak Tech., Inc,* 248 F.3d at 1329 (holding that even if the alternate embodiment existed in the specification, those "embodiments would not be covered by the language selected by the claim drafter"); *TIP Sys., LLC*, 529 F.3d at 1373 ("Our precedent is replete with examples of subject matter that is included in the specification, but is not claimed."). Here, the plain and ordinary meaning of "sleep mode" as a POSA would have understood it cannot be stretched to encompass a "partial sleep mode." In other words, a POSA would have understood the absence of any qualifying term or modifier to the term "sleep mode" to mean that there would be no content transmissions or reception. A500, 503 (Heegard Decl.) at ¶¶ 30, 37.[39]

[39] Importantly, the description relating to a "partial" sleep mode is absent from the '447 provisional. To the extent sleep mode is construed to cover a state where the transceiver is either transmitting or receiving content, Defendants reserve the right to challenge any claim of priority to the '447 provisional.

Therefore, a POSA would have understood that sleep mode as recited in the asserted claims of the Family 7 patents mean "a mode in which the circuitry is not transmitting or receiving content and is powered down."

(2) "powered down"

During a sleep mode, the circuitry is powered down.[40] Figure 2, which again is a "flow diagram of the operation of the present invention" (A6 ('730 patent) at 3:33–34), characterizes the sleep mode as a "power down operation" (A7 ('730 patent) at 6:12–13). *See also* A3 ('730 patent) at FIG. 2 (disclosing a "power down" indication at step 80). The specification repeatedly characterizes the sleep mode as a "power down operation of the CPE transceiver [that] begins on receipt of a power down indication (step 80) by the CPE transceiver controller." A7 ('730 patent) at 6:12–15; *see also id.* at 5:30–31 ("[T]he transceiver are powered down in accordance with the invention."), *id.* at 6:15–47 (disclosing a "power down" operation of the CPE and CO), *id.* at 6:65–7:1 (describing a "power down" state), A8 at 7:40–41, 8:1–2. Plaintiff also repeatedly refers to the power down operation in its Opening Brief to describe the alleged invention. *See supra* at 8 n.13, 17 n. 23, 35, 71.

To be clear, this power down operation as recited in the specification does not require the circuitry to be completely shut off, because the transceiver would be performing a synchronization operation even during sleep mode. A501-02 (Heegard Decl.) at ¶ 33; A7 ('730 patent) at 5:38–46; A115-A116 ('447 provisional) at 1–2 (distinguished between "shut down" and

[40] While Defendants maintain their original construction of "power to the circuitry is reduced for the purpose of power construction" is supported by the intrinsic record, in the interest of reducing the number of disputes, including mooting TQ Delta's contention that "Defendants' addition of 'for the purpose of power conservation' is improper" and that "Defendants' construction also improperly reads into 'sleep mode' the requirement that 'power to the circuitry is reduced" and is "potentially confusing and unduly narrow" *Supra* at 36, Defendants propose the term be construed as "powered down."

"powered down," where shut down refers to powering off the circuitry). Powered down merely requires that the circuitry be powered down to a state in which power consumption is reduced to a small amount because the circuitry need not transmit or receive content. *See* A501-02 (Heegard Decl.) at ¶ 33; A7 ('730 patent) at 5:52–55 ("It is thus desirable that the transceiver be able to suspend operations and enter a 'sleep' mode in which it consumes reduced power when it is not needed for data transmission or reception . . . ."); A103 (Jargon) at 507 ("Sleep is a temporary state where the computer uses a very small amount of the charge because it's not doing anything."). Plaintiff's assertion that "Defendants' construction is incorrect because it could be understood to cover a situation where the transceiver is not consuming any power or is turned off" is based on conjecture and moreover is moot in view of the foregoing explanation. *Supra* at 36. Defendants have not argued that it does, nor does Plaintiff provide any evidence that a person of skill in the art would understand Defendants' construction in that way. Furthermore, Plaintiff conveniently ignores that if the same flawed logic were applied to Plaintiff's construction, then Plaintiff's own construction would be understood to cover situations where the transceiver is not consuming any power and is turned off, because "the amount of power consumed is less than . . . a state with full data transmission capabilities" does not have an explicit lower limit and thus encompasses a "no power" state as well. *See* A503 (Heegard Decl.) at ¶ 38.

Defendants' constructions are consistent with the intrinsic evidence, because they recognize that certain aspects of "sleep mode" and "low power mode" overlap, but provide constructions that are not identical to accurately reflect that a POSA would understand the terms to have differing scope. *Compare* VI.A.2.b.1. *with* VI.B.2.b.2.

To cause confusion where there is none, Plaintiff manufactures issues based on conjecture to argue that Defendants' construction "injects ambiguity" and is "confusing." *Supra*. at 34.

Although Defendants' construction now consists of "powered down," Defendants address these assertions to clarify that neither their current nor their previous constructions are ambiguous. For example, Plaintiff argue that Defendants' construction "creates a technical ambiguity because it might be interpreted to require that the amount of power available to be provided to circuitry is reduced as opposed to the amount of power that is being provided to and consumed by the circuitry is reduced." *Id.* at 34. There is no ambiguity or confusion here because whether or not *power to the circuitry* or *power consumed* is used, each implies the other. A502 (Heegard Decl.) at ¶ 33 n.2. Plaintiff and its expert merely state that there "might be" different potential scenarios, but do not and cannot state that there is a meaningful distinction between the different potential scenarios. *See supra* at 34; A470 (Chrissan Decl.) at ¶ 32. The alleged distinction is of no consequence because the end result is that the circuitry is powered down. Plaintiff also recognizes the alleged invention involves the transceiver being powered down. *See supra* at 8 n.13, 17 n. 23, 35, 71. Therefore, in an interest of reducing the number of disputes, Defendants have adjusted their construction to recite "powered down."

3. Plaintiff's Reply Position

Defendants changed their construction of "sleep mode" in their Responsive Brief "in hopes of further narrowing the disputed issues." *Supra* at n.32. As discussed below, Defendants' new construction creates as many issues as its original one did and is incorrect for many of the same reasons that ADTRAN's construction of "low power mode" is.

a) "Sleep Mode" and "Low Power Mode" Should Have the Same Construction

Defendants are incorrect in arguing that the claimed "sleep mode" is different than the "low power mode" recited in the claims of the 404 patent.

Defendants first argue that "sleep mode" and "low power mode" are presumed to have different meanings. Defendants cite *Starhome GmbH v. AT&T Mobility LLC* in support of this argument, but that case is not determinative of the issue. *Supra* at 37. It states that claim differentiation "is not a hard and fast rule" and "does not trump the clear import of the specification." *Starhome*, 743 F.3d 849, 858 (Fed. Cir. 2014). Here, contrary to Defendants' argument that TQD "equates sleep mode and low power mode" without support, *see supra* at 37, TQD has shown that the intrinsic evidence must lead to a finding that claim differentiation does not apply.

As TQD explains above, "low power mode" does not appear in the specification, and, therefore, its meaning must be informed by its plain meaning and the description in the specification of the "sleep mode" and "low power sleep mode." Given that the specification does not distinguish between "low power mode" and "low power sleep mode,"[41] and does not discuss "low power mode" at all, there simply is nothing in the intrinsic record to suggest that "sleep mode" should be construed to have a different scope than "low power mode." *See Pickholtz v. Rainbow Techs., Inc.*, 284 F.3d 1365, 1373 (Fed. Cir. 2002) ("Although we would typically be inclined to give meaning to the word 'system,' rather than regard it as surplusage, the patent in this case provides no indication that the two terms mean different things. Instead, the patent uses the term 'computer system' in the specification and the term 'computer' in the claims; nothing in the patent itself explicates their relationship or indicates any difference in meaning." (citation omitted)).

[41] The title of the Family 7 Patents is "Multicarrier transmission system with low power sleep mode and rapid-on capability" and the summary of the Family 7 Patents twice refers to "a low power sleep mode." *See*, *e.g.*, A1 (730 patent), A6 (730 patent) at 3:11-12 and 3:19. The rest of the specification refers to just the "sleep mode."

For their part, Defendants try to fabricate a difference between "low power mode" and "sleep mode" where no discernible one exists. ADTRAN states that the alleged difference "is to be found in the degree of power reduction between the two states." *Supra* at 21. Defendants, however, do not point to any support in the intrinsic evidence for this distinction. Instead, the best Defendants can do is to argue that, because the specification refers to a sleep mode but not a low power mode, there is no "indicat[ion] that the two terms have the same meaning." *Supra* at 37. Of course, one could just as easily say that there is no indication that the two terms have a different meaning. In fact, the latter proposition is the more rational one. Indeed, given the silence in the specification with respect to "low power mode," it is far more likely that the applicant intended for "sleep mode" and "low power mode" to mean the same thing instead of the alternative – that they have different meanings even though nothing in the intrinsic record suggests what that difference may be. *See Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1120 (Fed. Cir. 2004) ("[T]he context does not show that 'connected' and 'associated' should be differentiated into the definitions proposed by Safari, and we must conclude that this is simply a case where the patentee used different words to express similar concepts . . . .").

Faced with a lack of support in the intrinsic record for their different constructions for "low power mode" and "sleep mode," Defendants rely on conclusory, extrinsic testimony from their declarant. *See Supra* at 38. Dr. Heegard's position that a POSA would have understood "low power mode" and "sleep mode" are different is supported by nothing but his say so. *See* A497, 502 (Heegard Decl.) at ¶¶ 23, 36; A543-44 (Chrissan Reply Decl.) at ¶ 6. In addition, he states that there is a "lack of guidance as to the meaning of low power mode," but then turns around and says a "POSA wound understand the two terms to have a different meaning." *See*

A502 (Heegard Decl.) at ¶ 36. If there is a lack of guidance to the meaning of "low power mode," how can he be sure it differs in meaning from "sleep mode"? He further states that a "POSA would understand that low power mode could also be an idle state, therefore low power mode and sleep mode cannot be the same." *See id*. Dr. Heegard, however, does not explain how or why that makes a low power mode different than a sleep mode in the way he proposes. Also, in opining that "low power mode" and "sleep mode" overlap in requiring that "transmission and reception is suspended," Dr. Heegard does not cite to anything or provide any explanation as to why this is the case. *See id*.[42] The Court should give no weight to this testimony. *See Network Commerce, Inc. v. Microsoft Corp.*, 422 F.3d 1353, 1361 (Fed. Cir. 2005) ("[C]onclusory, unsupported assertions by experts as to the definition of a claim term are not useful to a court. Here [the expert] does not support his conclusion with any references to industry publications or other independent sources.").

Accordingly, Defendants cannot point to any credible evidence to support the distinction they make between "sleep mode" and "low power mode."

[42] Dr. Heegard cites a number of dictionary definitions for "sleep mode" in his declaration. *See* A494-95, 497-98 (Heegard Decl.) at ¶¶ 17, 18, 24. Of course, the best source for the meaning of "sleep mode" (and "low power mode") is the intrinsic evidence. To the extent the definitions of sleep mode are not consistent with the teaching of intrinsic evidence, they are not helpful. *Bell Atl. Network Servs. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1269 (Fed. Cir. 2001) ("[E]xtrinsic evidence . . . may not be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the specification . . . ."). Dr. Heegard did not explain why the definitions of sleep mode demonstrate that "sleep mode" should be construed differently than "low power mode" in the way he proposes. *See* A543-44 (Chrissan Reply Decl.) at ¶ 6.

b) Defendants' Construction is Not Consistent with the Intrinsic Evidence or Ordinary Meaning

(1) "the circuitry is not transmitting or receiving content"

Most of the arguments Defendants made for including "the circuitry is not transmitting or receiving content" in their construction were also made by ADTRAN in support of its construction of "low power mode." As TQD has already responded to those common arguments *supra* at Section VI.A.3.b, it does not repeat them here.

Defendants make one additional argument that is not found in ADTRAN's argument with respect to "low power mode." In particular, Defendants argue that their construction is "consistent with the plain and ordinary meaning" of "sleep mode" and that a "POSA would have understood that content is not transmitted or received." *See supra* at 40. Defendants cite to solely extrinsic evidence (treatises and declaration testimony) to support this contention. *See id*. As discussed above with respect to "low power mode," any construction of "sleep mode" or "low power mode" that requires that the circuitry not transmit or receive content is not consistent with the intrinsic evidence, which discloses sleep mode embodiments that do not require cessation of transmission and reception of data (or "content"). Therefore, even assuming Defendants' extrinsic evidence supports their construction, that evidence should be disregarded by the Court. *Bell Atl.*, 262 F.3d at 1269 ("[E]xtrinsic evidence . . . may not be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the specification . . .").

In addition, in the same way ADTRAN's construction of "low power mode" was not compatible with the surrounding language of claim 1 of the 404 patent, Defendants' "sleep mode" construction is not compatible with the surrounding language of the asserted claims of the 382, 730, and 753 patents. Claim 14 of the 382 patent recites a "transceiver having a sleep mode

capability" and "a transmitter or receiver portion capable of: placing at least one component of a first multicarrier transceiver in a sleep mode." Similarly, claim 18 of the 730 patent recites a "transceiver having a sleep mode capability" and "plac[ing] at least one component of" a "multicarrier transceiver in a sleep mode," and claim 1 of the 753 patent recites a "transceiver having a sleep mode capability" and "reducing power to selected portions of transceiver circuitry." Thus, those claims cover an instance where just one of the transmitter or receiver is in a "sleep mode" and the other is in full power mode. *See* A545 (Chrissan Reply Decl.) at ¶ 9. Defendants' construction of "sleep mode," which requires that "circuitry is not transmitting or receiving content," makes no sense in the context of the claims of the 730, 382, and 753 patents. *Id*.

(2) "powered down"

Defendants' argument that "sleep mode" must be construed to mean "powered down" is also incorrect. Defendants point to portions of the specification that refer to "power down." *Supra* at Section VI.B.2.b.ii. While it is true that the specification does use this terminology, it is not helpful in construing "sleep mode" because the phrase "powered down" could be interpreted to cover an "off" or a "no power mode." Indeed, nothing in "powered down" indicates that power does not go down to zero. *See* A544 (Chrissan Reply. Decl.) at ¶ 7. As discussed above with respect to "low power mode," the specification and surrounding claim language makes it clear that a "low power" or "sleep" mode cannot encompass a state where the transceiver is turned off. *See supra* at 36 (citing A7-8, A10 (730 patent) at 6:67-7:11, 11:14-18; A33 (382 patent) at 11:1-3; A21 (753 patent) at 10:5-9).

Defendants state that "powering down" does not require the circuitry to be completely shut off and further argue that it is TQD's construction of "sleep mode" that could be understood to cover situations where the transceiver is turned off. *Supra* at 42. TQD's construction includes

the language "a state of operation in which power is consumed." As an "off mode" would not consume power, TQD's construction does not cover such a mode. *See* A545-46 (Chrissan Reply Decl.) at ¶ 11. Therefore, since Defendants agree that "sleep mode" should not cover a situation where the circuitry is shut off, Defendants should not have any problem agreeing to TQD's proposed construction.

In the middle of their arguments as to why "sleep mode" should be construed to include the "powered down" language, Defendants shift gears and state that, even though their constructions of "sleep mode" and "low power mode" are different, the constructions are still "consistent with the intrinsic evidence" because, while "certain aspects" of the two modes "overlap," a "POSA would understand the terms to have differing scope." *Supra* at 43. Again, neither ADTRAN, nor Defendants in general, point to anything in the intrinsic evidence that supports the distinction they make between "sleep mode" and "low power mode." As discussed above, the alleged distinction between the two terms is based entirely on conclusory extrinsic declaration testimony. *See supra* at 21 and 38; A497, A501-02 (Heegard Decl.) at ¶¶ 23, 32, 36. As such, Defendants' differing constructions for "sleep mode" and "low power mode" are not "consistent with the intrinsic evidence."

4. Defendants' Sur-Reply Position

a) "Low Power Mode" and "Sleep Mode" Are Different

Sleep mode and low power mode are not the same thing. Plaintiff argues that *Starhome GmbH v. AT&T Mobility LLC* is "not determinative of the issue," *Supra* at 45, but nonetheless fails to overcome the presumption that low power mode and sleep mode have different meanings in light of the claims' clear distinction between the two terms. *See* A9 ('730 patent) at 10:23–26 ("wherein placing said at least one component of said first multicarrier transceiver in the sleep mode comprises placing said at least one component of said first multicarrier in a low power

mode"); *see also* A32–33 ('382 patent) at 10:36–39 (Claim 6), 12:1–5 (Claim 19). Plaintiff argues that claim differentiation "does not trump the clear import of the specification," *supra* at 45, but it identifies no "clear import" dictating the two are the same. Instead, Plaintiff argues that the absence of "low power mode" in the specification means it must be the same as "sleep mode." The absence of reference to "low power mode" is far from the "clear import" needed to overcome the plain distinction that the claim language draws—differing claim language that the patentee chose.

Plaintiff's reliance on *Pickholtz v. Rainbow Technologies, Inc.* is misplaced because in this instance the claims recite both low power mode and sleep mode. 284 F.3d 1365, 1373 (Fed. Cir. 2002). In *Pickholtz*, the court explained that "the patent uses the term 'computer system' in the specification and the term 'computer' in the claims; nothing in the patent itself explicates their relationship or indicates any difference in meaning." *Id.* The same is not true for low power mode and sleep mode. Claim 6 of the '730 patent states, "wherein placing said at least one component of said first multicarrier transceiver in the sleep mode comprises placing said at least one component of said first multicarrier in a low power mode." A9 ('730 patent) at 10:23–26; *see also* A32–33 ('382 patent) at 10:36–39 (Claim 6), 12:1–5 (Claim 19). The terms here are not mere "synonyms" like in *Pickholtz*. Instead, the intrinsic evidence treats low power mode and sleep mode as different terms with differing meanings. A558 (Heegard Sur-Reply Decl.) at ¶ 3.

Plaintiff's reliance on *Innova/Pure Water Inc. v. Safari Water Filtration System* is also misplaced because the terms in that instance were different terms whose plain meanings were the same. 381 F.3d 1111, 1119–20 (Fed. Cir. 2004) (finding the terms plain and ordinary meaning of the two terms were "very similar" and therefore, should not be differentiated). Here, Dr. Heegard has explained that the ordinary meaning for sleep mode is different from low power mode. A494-

95, 497-98, 502 (Heegard Decl.) at ¶¶ 17–18, 23–25, 36. Plaintiff has provided nothing to show the ordinary meaning of the terms, but instead relies on the lack of any meaning ascribed to "low power mode" in the specification. A person of ordinary skill in the art would recognize that the power reduction for sleep mode is greater than the power reduction for low power mode by virtue of the term "sleep." A494-95, 501-02 (Heegard Decl.) at ¶¶ 17, 33–34. Accordingly, the term sleep mode as it appears in the asserted claims of the '730, '753, and '382 patents has a different meaning from the term low power mode as it appears in the asserted claims of the '404 patent.

b) Defendants' Construction is Consistent with the Intrinsic Evidence and is the Plain and Ordinary Meaning

(1) "the circuitry is not transmitting or receiving content"

Plaintiff argues that Defendants' construction of sleep mode is incorrect because the construction "define[s] that term with respect to what is or is not transmitted or received, and not with respect to power."[43] *Supra* at 27. To begin, Defendants' construction also defines the term with respect to power. Moreover, it is proper to describe the mode or state of a device by what actions or conditions will or will not take place during the mode or state. Plaintiff's criticism is also at odds with its own construction that defines full power mode solely by reference to "data transmission capabilities."

Next, Plaintiff attempts to limit Defendants' intrinsic support to merely the language of "present invention," and argue such language is "not always so limiting, such as where the

[43] Plaintiff states, "Most of the arguments Defendants made for including 'the circuitry is not transmitting or receiving content' in their construction were also made by ADTRAN in support of its construction for low power mode. As TQD has already responded to those common arguments supra, it does not repeat them here." Yet Plaintiff fails to cite to which arguments from low power mode it incorporates into the sleep mode argument. Defendants' will attempt to address Plaintiff's arguments that may apply to "sleep mode."

references to a certain limitation as being the 'invention' are not uniform, or where other portions of the intrinsic evidence do not support applying the limitation to the entire patent." *Supra* at 28 (citing *Absolute Software, Inc. v. Stealth Signal, Inc.*, 659 F.3d 1121, 1136 (Fed. Cir. 2011)); *see also id.* at 28 (Plaintiff asserting that other embodiments exist that do not encompass sleep mode).[44] That is not the case here. From the '447 provisional application to the Abstract and the embodiments in the specification, in every instance where sleep mode is discussed, the intrinsic evidence states that transmission or reception of data does not occur. *See* A1 ('730 patent) at Abstract; A6 ('730 patent) at 3:34–35; A3 ('730 patent) at FIG. 2; A7 ('730 patent) at 5:47–55; *see also* A8 ('730 patent) at 8:8–10; A115–17 ('447 provisional) at 1–3. Plaintiff ignores this repeated and consistent disclosure of the specification and argues there are other embodiments for sleep mode. Plaintiff, however, does not identify any description of "the present invention" that is inconsistent with descriptions of "the present invention" on which Defendants rely or that supports not applying the limitation to the entire patent. Even when the specification provides "other illustrative embodiments," such as an idle state, those embodiments show that "the circuitry is not transmitting or receiving content." *See supra* at 39.

Plaintiff's reliance on "other ways" of going into a low power mode, Pl. Reply Br. at 6, proves nothing. The portions of the specification on which Plaintiff relies here relate to power reduction, not whether the circuitry is transmitting or receiving content. These statements are insufficient to contradict the specification's clear teaching that content is not transmitted or received in sleep mode or low power mode. Plaintiff's reliance on the claim language, *supra* at 29, 48, fares no better. Again, these limitations relate to power reduction, not whether content is

[44] This argument was made for "low power mode," but will be addressed because Plaintiff did not adequately disclose which particular argument of "low power mode" applied to "sleep mode."

transmitted or received. That content could be transmitted or received when only limited portions of the transceiver have reduced power consumption does not overcome the specification's teaching that no transmitting or receiving of content occurs in sleep mode or lower power mode in the present invention.

(2) Plaintiff Already Agreed to Defendants' Construction of Data

In an attempt to reduce disputes, Defendants expressed the limitation that certain data is not transmitted or received during sleep mode and low power mode by referring to that data as "content." Defendants intended to cover "data" in a similar sense as used in U.S. Patent No. 9,094,268 ("the '268 patent") at issue in the MoCA cases and adopted this agreed upon construction into their construction here. While Plaintiff may dispute that content is neither transmitted nor received in the claimed modes, there is no discernable reason for it to quibble over the use of "content" rather than "data" in the construction. Plaintiff argues "content" injects ambiguity into the construction, but provides no explanation of how the term is more ambiguous than "data" or why the term was not sufficiently ambiguous to disagree with its use in the MoCA cases.

(3) "powered down"

Plaintiff argues that "powered down" may be understood as the power going to zero. However, that is not how a POSA would understand "powered down." In the '447 provisional, the patentee distinguished between "shut down" and "powered down." A115–A116 ('447 provisional) at 1–2. "Shut down" referred to circuitry that was completely off, or "down to zero" while "powered down" for sleep mode was to "minimize [the computer's] power consumption when not actively being used." A115 ('447 provisional) at 1; A559 (Heegard Sur-Reply Decl.) at ¶ 5. The transceiver "needs to keep power to its transmit line driver, and its other analog circuitry,

but since only a pilot tone needs to be generated the modulation circuitry can be powered down." A117 ('447 provisional) at 3. Therefore, "powered down" does not mean being shut down. Furthermore, the claims themselves require "a synchronizer module that uses a synchronization signal . . . while . . . in the sleep mode." A10 ('730 patent) at 11:15–19; *see also* A21 ('753 patent) at 10:5–14; A32–A33 ('382 patent) at 10:66–11:3. Because the claim requires a synchronization signal to be sent during sleep mode, the transceiver will not be completely "shut down." As a further compromise, Defendants are amenable to language of the '447 provisional that the "power is minimized" as an alternate to "powered down." This construction is equally consistent with the intrinsic evidence and the extrinsic evidence provided in technical dictionaries. *See* A103 (Jargon) at 507 ("Sleep is a temporary state where the computer uses a very small amount of the charge because it's not doing anything.").

C. "synchronization signal" (recited in the asserted claims of the 730, 382, and 404 patents)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
"*a signal used to maintain a timing relationship between transceivers by correcting errors or differences between a timing reference of the transmitter of the signal and a timing reference of the receiver of the signal*"	"*a signal used to establish or maintain a timing relationship between transceivers that does not transmit content*"

1. Plaintiff's Opening Position

In the MoCA suit, TQD proposed that "synchronization signal" be construed to mean "an indication used to establish or maintain a timing relationship between transceivers." While Patent Owner continues to believe that that construction is correct, based on a misapplication of that construction by a petitioner in an *inter partes* review of the 404 patent, further clarification of that construction is necessary. Thus, TQD proposes that the construction of "synchronization signal" be refined to mean "a signal used to maintain a timing relationship between transceivers

by correcting errors or differences between a timing reference of the transmitter of the signal and a timing reference of the receiver of the signal." This construction is consistent with the construction advanced by TQD in the MoCA suit because, in the context of multicarrier systems, a synchronization signal is primarily used to correct or compensate for errors or differences between the timing references of the transmitter of the signal and the receiver of the signal. As a result of correcting errors or differences, the timing relationship between the transmitter and the receiver (the transceivers) is maintained. *See* A471-72 (Chrissan Decl.) at ¶ 35.

TQD's construction is supported by the specification and technical dictionaries. For example, while the term "synchronization signal" does not appear in the specification, the specification explains that a transmitter of a remote transceiver derives a "timing reference signal 62a" from its clock. *See* A42 (404 patent) at 5:37-45;[45] A471 (Chrissan Decl.) at ¶ 33. The specification further explains that the phase locked loop of the local receiver locks itself to the timing reference signal to synchronize its clock with the clock of the transmitter. *See* A42 (404 patent) at 5:48-50;[46] A471 (Chrissan Decl.) at ¶ 33. The specification goes on to explain that the transmission of the "synchronizing pilot tone 62a" "maintain[s] synchronization during the power down or idle state." A43 (404 patent) at 7:13-15 (emphasis added); A471 (Chrissan Decl.) at ¶ 33. Thus, in view of the specification, the claimed "synchronization signal" would be

[45] "During normal (non-sleep mode) operation, a phase-lock loop (PLL) 62 receives from the FFT 56 a timing reference signal 62a (see FIG. 1A) via a line *62b*. The timing reference signal *62a* is transmitted from the transmitter with which the receiver 16 communicates (e.g., the CO transmitter). This signal is advantageously a pure tone of fixed frequency and phase which is synchronized with the Master Clock in the transmitter; its frequency defines the frame rate of the transceivers."

[46] "The PLL 62 locks itself to this signal and drives clock 30 in synchronism with the Master Clock in the driving transmitter."

understood to be a signal used to maintain a timing relationship between transceivers. *See* A471 (Chrissan Decl.) at ¶ 33.

Turning to technical treatises, a "synchronous transmission" is defined to include "check[ing] for and correct[ing] any variations in timing." *See* A86 (Dictionary of Networking, 3rd Ed.) at p. 360 (emphasis added). Also, it would have been known in the art that a phase locked loop (like the one described in the specification) is used to correct errors in timing. *See* A92 (Modern Digital and Analog Communication Systems, 3rd Ed.) at p. 184 ("The operation of a PLL is similar to that of a feedback system. . . . If the signal fed back is not equal to the input signal, the difference (known as the error) will change the signal fed back until it is close to the input signal.") (emphasis added). Thus, a person of skill in the art would understand that the claimed "synchronization signal" maintains the timing relationship between transceivers by correcting errors or differences between a timing reference of the transmitter and a timing reference of the receiver. *See* A471 (Chrissan Decl.) at ¶ 34.

Defendants' proposed construction improperly reads the requirement of "not transmit[ting] content" into the claimed "synchronization signal." Again, the word "content" does not appear anywhere in the specification, and the specification certainly does not state that a synchronization signal does not transmit content. Moreover, there is nothing in the plain meaning of "synchronization signal" that requires that it not transmit content. Thus, Defendants' construction reads a limitation into the claims that is not found anywhere in the intrinsic evidence. *See* A472 (Chrissan Decl.) at ¶ 36. Beyond that, because "content" is undefined, the addition of "that does not transmit content" to their construction only injects ambiguity into the meaning of "synchronization signal." *See id*. Thus, Defendants' construction should be rejected.

2. Defendants' Answering Position

The parties agree that the claimed "synchronization signal" is a "signal used to maintain [a/the] timing relationship between transceivers." Beyond that, the specification is clear that the synchronization signal is also used to establish a timing relationship and that it is not used to transmit content. Plaintiff, however, ignores these portions of the specification and instead presents a construction that inappropriately limits the term to a single embodiment and also provides an incomplete understanding of the term.

a) Defendants' Construction is Consistent with the Specification and Plain and Ordinary Meaning

To begin, Defendants' construction agrees with the plain and ordinary meaning of synchronization signal to a POSA. The term is commonly used for signals in electronic devices, including telecommunication devices. For example, IEEE recognized a synchronizing signal as a "signal which may be sent to establish or maintain a fixed relationship in synchronous systems." A106 (IEEE) at 1325. This definition is consistent with Defendants' construction and, as described below, how the Family 7 patents use synchronization signal. A503-05 (Heegard Decl.) at ¶ 40-43.

Although the specification does not recite the term "synchronization signal," it explains how the claimed transceivers are able to establish and maintain synchronization. The specification describes a timing reference signal which is a pure tone or pilot tone. A7 ('730 patent) at 5:19–27 ("The timing reference signal 62a is transmitted from the transmitter with which the receiver 16 communicates (e.g., the CO transmitter). This signal is advantageously a pure tone of fixed frequency and phase which is synchronized with the Master Clock in the transmitter…"); *id.* at 6:67–7:3 ("In order to maintain synchronization during the power down or idle state, the CO transceiver continues to transmit to the CPE transceiver the synchronizing pilot

tone 62a."). This "pure tone" or "pilot tone" synchronization signal is, in turn, synchronized with the Master Clock and is used to synchronize the frame counter in the receiver. *Id.* Thus, the specification is fully consistent with the plain and ordinary meaning that a synchronization signal is used to establish or maintain a timing relationship. A504 (Heegard Decl.) at ¶ 41.

Further, the synchronization signal does not transmit content[47] because it is merely used to keep the transceivers in sync. A505 (Heegard Decl.) at ¶ 43. The synchronization signal does not send content to the actual user, but this does not foreclose the synchronization signal from sending control data. *Id.*; A8 ('730 patent) at 7:8–12 ("Power will be maintained, of course, to at least that portion of the analog driver circuitry which transmits the pilot tone and other control signals to the CPE transceiver, and to line circuits required to monitor the line 14 for signals from the CPE transceiver."). A POSA would not expect a synchronization signal to send content as understood by the specification, and having the synchronization signal transmit content would be inconsistent with the purpose of sleep mode. A505 (Heegard Decl.) at ¶ 43. When the device is in sleep mode, content is not transmitted. Thus, the synchronization signal does not send content.

Therefore, a POSA would understand a "synchronization signal" as "a signal used to establish or maintain the timing relationship between transceivers that does not transmit content."

b) Plaintiff's Construction Provides an Incomplete Description of a Synchronization Signal and Incorrectly Narrows the Term

Plaintiff's construction is limited to one embodiment of using a synchronization signal. A POSA would recognize the timing reference signal as the synchronization signal. A505-06 (Heegard Decl.) at ¶ 44. The timing reference signal could be used in the PLL, as provided in the specification, but is not mandatory or required. A6 ('730 patent) at 4:47–48 ("In the case of a

[47] Again, Defendants adopt the construction of "data" provided by the Court in the MoCA cases.

transceiver at the subscriber premises, such as is shown here for purposes of illustration, the clock is derived from the master clock at the central office…"). A POSA would understand that an illustrative use of the timing reference signal with the PLL would be instructive, but not mandatory to practice the disclosed invention. A505-06 (Heegard Decl.) at ¶ 44. However, using Plaintiff's construction, a POSA would be confined to only using the timing reference signal in combination with the PLL or some other type of error correction format. This is contrary to the disclosure in the specification. *Id*. Therefore, Plaintiff's construction forecloses using other methods to synchronize the transceiver.

In addition, Plaintiff's construction is only supported by the cherry picked extrinsic evidence Plaintiff provides. A synchronization signal is a common term used in electrical devices, of which telecommunication devices fall under, and is typically disclosed as a pilot tone. The manner of using a synchronization signal is not typically recited when disclosed in systems because systems can be synchronized in multiple ways. A504-05 (Heegard Decl.) at ¶ 41-42. (synchronous systems are established using pilot tones, using one clock to drive both systems, comparing clock signals, etc.). The specification does not provide any definition, thus a POSA would have understood the claimed synchronization signal to encompass commonly understood synchronization signals, including any synchronization signal that is disclosed in the specification. *See id.*; A7 ('730 patent) at 5:28–31("Other forms of timing signal may, of course, be used, but use of a pure tone has the advantage of simplicity and reliability when portions of the transceiver are powered down in accordance with the invention."). In general, a "timing signal" is typically referred to simply as an "output of a clock". A113 (Newton's Telecom) at 607; A109 (Fiber Optics) at 1037. Therefore, Plaintiff's references only provide a small picture of the wider range of possibilities for the synchronization signal. Extrinsic evidence

which is not consistent with intrinsic evidence is entitled to little weight. *See Transcend Med., Inc. v. Glaukos Corp.*, No. 13-830, 2015 WL 263612, at *7 (D. Del. Jan. 16, 2015) ("[E]xtrinsic evidence 'may not be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the specification or file history.'").

Therefore, Plaintiff should not be allowed to unnecessarily narrow synchronization signal to one method where the plain and ordinary meaning and the specification encompass others. As such, synchronization signal should be construed as "a signal used to establish or maintain the timing relationship between transceivers that does not transmit content."

3. Plaintiff's Reply Position

a) Defendants' Construction is Not Consistent with the Specification or the Plain and Ordinary Meaning

Defendants start by arguing that their construction agrees with the plain and ordinary meaning of "synchronization signal" because it is consistent with an IEEE definition of that term. *Supra* at 58. That is not the case. The cited definition is a "special signal which may be sent to establish or maintain a fixed relationship in synchronous systems." *Id*.; A106 at 1325. Defendants' construction, however, includes the phrase "that does not transmit content"[48] – a phrase missing from the dictionary definition. Thus, Defendants' construction is not "consistent" with the definition. *See* A546 (Chrissan Reply Decl.) at ¶ 12.

Defendants also argue that their construction is consistent with description in the specification of the timing reference signal or pilot tone. *Supra* at 58. For at least two reasons, that is not the case either. First, the specification does not state that the timing reference signal

[48] This now makes three disputed claim terms into which Defendants are trying to read the limitation that "content" not be transmitted – this despite the fact that the word "content" never appears in the intrinsic record.

or pilot tone do not transmit "content." *See* A546 (Chrissan Reply. Decl.) at ¶ 12. Indeed, the word "content" cannot be found in the intrinsic evidence. Second, the specification does not support Defendants' requirement that the signal be used to "*establish or* maintain a timing relationship between transceivers." *Id*. While the specification explains that the timing reference signal is used to "maintain synchronization," *see* A43 (404 patent) at 7:13-15, nowhere does it describe the signal as "establishing" synchronization. *See* A546 (Chrissan Reply Decl.) at ¶ 13. Other parties who have challenged the validity of the 404 patent in *inter partes* reviews have agreed that "synchronization signal" should not be construed to include the word "establish." In IPR2016-01466, *Cisco Systems, Inc. v. TQ Delta, LLC* and in IPR2016-01470, *Dish Network, LLC v. TQ Delta, LLC*, the two different Petitioners construed "synchronization signal" to mean "*a signal used to maintain timing between transceivers.*" *See* A134 (IPR2016-01466 Petition) at 12; A208 (IPR2016-01470 Petitioner Reply) at 5.

Furthermore, even assuming, *arguendo*, that the signal is used for "establishing" a timing relationship, Defendants' insertion of the disjunctive "or" between "establish" and "maintain" is improper. The specification explains that the signal is used to "maintain" synchronization during the low power mode. Similarly, the asserted claims of the 382 and 730 patents recite that the "synchronization signal" is used to "maintain synchronization" between transceivers in the sleep mode. *See* A10 (730 patent) at 11:14-18;[49] A32-33 (382 patent) at 10:66-11:3.[50] Therefore, a construction of "synchronization signal" that encompasses a signal that only establishes, but does

[49] "[A] synchronizer module that uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component . . . ."

[50] "[M]aintaining synchronization between the first multicarrier transceiver and a second multicarrier transceiver using a synchronization signal while the at least one component of the first multicarrier transceiver is in the sleep mode . . . ."

not maintain, a timing relationship – like Defendants' – is not consistent with the intrinsic evidence. *See* A547 (Chrissan Reply. Decl.) at ¶ 14.

Defendants further argue that the "synchronization signal does not transmit content because it is merely used to keep the transceivers in synch." *Supra* at 59. Defendants rely on extrinsic declaration testimony to support their position. *Id*. The cited testimony, however, is again conclusory and not supported by any evidence, intrinsic or extrinsic, that explains that a synchronization signal cannot contain content. *See* A505 (Heegard Decl.) at ¶ 43. Moreover, neither Defendants, nor their declarant, explain where they got the word "content" – outside of some footnotes about how the Court adopted "content" as a construction for another term in another patent in another case. They also fail to clarify what "content" means. Further to that point, Defendants and their declarant concede that the "synchronization signal" could send "control data." *Supra* at 59; A505 (Heegard Decl.) at ¶ 43. Defendants' use of "content" creates more problems than it solves.

b) Defendants' Critiques of TQD's Construction Are Misplaced[51]

Defendants erroneously argue that TQD's construction is limited to one embodiment of using a synchronization signal. In particular, Defendants argue that the use of a PLL with the

[51] As noted above, TQD's construction is a clarification of the construction it proposed in the MoCA case and the one adopted by the Court in that case. The Court can modify its construction from the MoCA case. The Federal Circuit has found that a district court may adopt an "evolving" or "rolling" claim construction as the court better understands the technology and the patents at issue. *See Pressure Prods. Med. Supplies, Inc. v. Greatbatch Ltd.*, 599 F.3d 1308, 1316 (Fed. Cir. 2010) ("[D]istrict courts may engage in a rolling claim construction, in which the court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves."); *Utah Med. Prods., Inc. v. Graphic Controls Corp.*, 350 F.3d 1376, 1381–82 (Fed. Cir. 2003) (same); *Jack Guttman, Inc. v. Kopykake Enters., Inc.*, 302 F.3d 1352, 1361 (Fed. Cir. 2002) (same); *TQP Dev., LLC v. Intuit Inc.*, No. 2:12-CV-180-WCB, 2014 WL 2810016, at *6 (E.D. Tex. June 20, 2014) ("[P]revious claim construction orders provide an important starting point, but the prior orders in related cases do not bar the Court from conducting additional construction in order to refine earlier claim constructions.").

timing signal disclosed in the specification "is not mandatory or required" and that "using Plaintiff's construction, a POSA would be confined to only using the timing reference signal in combination with the PLL or some other type of error correction format." *Supra* at 59. This is a straw man argument. TQD's construction does not refer to a PLL or any "other type of error correction format." Instead, as explained above, TQD's construction just clarifies how a synchronization signal maintains a timing relationship (something both sides agree that the synchronization signal does). Moreover, TQD's construction is not "contrary" to the specification as Defendants assert. *Supra* at 60. It is in fact based on, and consistent with, a POSA's understanding of how the timing reference signal disclosed in the specification is used to maintain a timing relationship between two transceivers. *See supra* at 56 (citing A42-43 (404 patent) at 5:37-45, 5:48-50, 7:13-15; A471 (Chrissan Decl.) at ¶ 33).

Defendants also allege that TQD's construction is only supported by cherry picked extrinsic evidence. *Supra* at 60. Notably, Defendants do not state that any of TQD's extrinsic evidence is incorrect, rather their criticism is just that it "only provide[s] a small picture of the wider range of possibilities for the synchronization signal" and, therefore, allegedly is "not consistent with [the] intrinsic evidence." *Supra* at 60. TQD's construction, however, is not limited to a particular type of synchronization signal as Defendants seem to suggest – instead it clarifies how a synchronization signal (whether it is a pilot tone, timing reference signal, pure tone, *etc*.) maintains a timing relationship between transceivers, *i.e.*, by correcting errors or differences between timing references of the transmitter and receiver of the signal. Indeed, another expert adverse to TQD in an *inter partes* review of the 404 patent agrees that synchronization involves correcting errors between a transmitter and receiver. *See* A196 (Ex. 1012, Kiaei Decl., from IPR2016-01466, *Cisco Systems, Inc. v. TQ Delta, LLC*) at ¶ 17 ("[A]s

shown in the [American National Standards Institute (ANSI) T1.413-1995 Standard], a POSITA knew that a purpose of maintaining synchronization is to correct errors or differences that may periodically exist between transceivers.").

Furthermore, for all their talk about TQD's construction "foreclose[ing] using other methods to synchronize the transceiver," *see supra* at 60, Defendants do not actually point to a specific kind of synchronization signal that does not correct errors between timing references of the transceivers. Defendants say that "synchronization signal" can "encompass . . . any synchronization signal that is disclosed in the specification," including a pilot tone and a timing signal, but Defendants do not explain why or how those types of signals do not correct errors. *Supra* at 60. Again, the specification explains that the PLL of the CPE locks on to the pilot tone/timing signal 62a disclosed in the specification. A POSA would understand this is done to correct timing errors. *See* A43 (404 patent) at 7:13-15; *supra* at 56 (citing A42 (404 patent) at 5:37-45, 5:48-50; A471 (Chrissan Decl.) at ¶¶ 33-34); A547 (Chrissan Reply Decl.) at ¶ 15.

Moreover, none of the extrinsic dictionary definitions Defendants rely on in support of their argument – which, incidentally, define the term "timing signal," not "synchronization signal" – is inconsistent with TQD's position that a synchronization signal corrects errors between timing references of the transmitter and receiver. *See supra* at 60; A109 (Fiber Optics Standard Dictionary) at 1037 ("1. The output of a clock. 2. A signal used to synchronize interconnected equipment."); A113 (Newton's Telecom Dictionary) ("The output of a clock. A signal used to synchronize connected equipment."). *See* A548 (Chrissan Reply Decl.) at ¶ 16.

The only extrinsic evidence cited by Defendants that is not consistent with TQD's construction is the conclusory testimony of their expert. *See* A505-06 (Heegard Decl.) at ¶ 44 ("A synchronization signal does not have to be corrected against a reference, as Plaintiff's

construction requires."). Dr. Heegard does not explain how or why a synchronization signal is not used to correct errors. In addition, the section of the specification that he contends supports his position that error correction is not mandatory merely describes the CPE transceiver having a clock that is derived from the master clock at the central office. *Id*.; A6 (730 patent) at 4:47-48. Again, as explained above, the specification states that the CPE clock is able to do that by locking its PLL to the timing signal to drive the clock in synchronism with the master clock of the CO. *See* A7 (730 patent) at 5:31-33. As also explained above, a POSA would understand that a PLL corrects errors in timing. *See supra* at 57 (citing A92 (Modern Digital and Analog Communication Systems, 3rd Ed.) at 184).

In support of his position that error correction is not mandatory, Dr. Heegard states that "the timing reference from the Master Clock provided in the specification could be sent to the CO and CPE transceivers" and could be "just a pilot tone." *See* A505-06 (Heegard Decl.) at ¶ 44. Again, Dr. Heegard does not explain why or how the timing reference signal or the pilot tone does not correct errors. *See* A547 (Chrissan Reply Decl.) at ¶ 15. Furthermore, his position does not make sense in view of the description in the specification of the PLL of the CPE locking on to the pilot tone/timing signal 62a. Again, a PLL is used to correct timing errors. *See supra* at 57 (citing A92 (Modern Digital and Analog Communication Systems) at 184; A471 (Chrissan Decl.) at ¶ 34).

Dr. Heegard contends that TQD's expert, Dr. Chrissan, erroneously described the function of a PLL as synchronizing the frequencies of transceiver clocks. *See* A506 (Heegard Decl.) at n.3. Dr. Heegard says a PLL's main function is to synchronize phases, not frequencies. *Id*. First, Dr. Chrissan did not say that a PLL is used solely to synchronize frequencies. Secondly, one of Dr. Heegard's own patent applications confirms Dr. Chrissan's understanding

that a PLL is used to synchronize frequencies. *See* A423 (US 2002/0176520) at ¶ [0002] ("[R]eceivers employ a phase-locked loop (PLL) to acquire and track carrier frequency offsets and carrier phase offsets. During an initialization period, the PLL locks onto the carrier frequency offset and carrier phase offset. Following this period, the PLL tracks these two parameters."). Thus, Dr. Heegard's criticism of Dr. Chrissan's analysis is baseless. *See* A548 (Chrissan Reply Decl.) at ¶ 17.

Moreover, Dr. Heegard's patent application elsewhere confirms that the purpose of synchronization of a transmitter and receiver is correcting frequency (or timing) errors – and, thus, supports TQD's construction. *See* A547 (Chrissan Reply Decl.) at ¶ 15. The patent application states "demodulation of digitally modulated signals requires a receiver to be **synchronized** to the carrier frequency offset and carrier phase offset of the received signal relative to the transmitted signal. If left **uncorrected**, the carrier frequency offset at the receiver may rotate the transmitted signal constellation, which introduces **errors** each time a received symbol rotates past the boundary of a decision region." *See* A423 (US 2002/0176520) at ¶ [0001].

4. Defendants' Sur-Reply Position

Defendants' construction is consistent with the plain and ordinary meaning of a synchronization signal. Plaintiff's construction that the synchronization signal maintain a timing relationship between transceiver *by correcting errors or differences between timing references* in the transceivers is unnecessarily narrow. Nothing in the claims or specification requires importing that language into the claim. The use of synchronization signal was widely known prior to the Family 7 patents, and its plain and ordinary meaning at that time was not so limited. Defendants' construction is consistent with both the plain and ordinary meaning of the term and the specification.

a) Plaintiff Previously Proposed A Similar Construction

With the exception of the "does not transmit content" language,[52] Plaintiff proposed nearly the exact same construction in the MoCA case as Defendants propose here. There, Plaintiff proposed "synchronization signal" be construed as "an indication used to establish or maintain a timing relationship between transceivers." A68 (MoCA Markman Order) at 19. The only difference from that to Defendants' construction is "indication" versus "signal," and Plaintiff now proposes that signal is correct.

Plaintiff now seeks a narrower construction arguing that it believes "clarifies how a synchronization signal (whether a pilot tone, timing reference signal, pure tone, *etc.*) maintains a timing relationship between transceivers." *Supra* at 64. Plaintiff's addition actually adds unnecessary ambiguity. First, as Dr. Heegard explains, the inclusion of "correcting errors or differences" as part of the construction would interject more confusion and ambiguity, because what constitutes error correction to one of ordinary skill in the art may vary substantially from person to person. A559-60 (Heegard Sur-Reply Decl.) at ¶ 7–8. Plaintiff's proposal should thus be seen for what it is: an attempt to narrow the construction so that it can allege shortcomings in prior art that discloses the use of synchronization signals.

b) Plaintiff's Proposed Construction Lacks Support

The only alleged support Plaintiff provides for its narrow construction is the PLL example provided for illustrative purposes and a treatise describing a PLL. *Supra* at 65. Plaintiff's logic is wrong for both technical and legal reasons. First, relying on the PLL example alone ignores other

[52] The inclusion of the "does not transmit content" language is proper as it provides clarification that synchronization signal is not regular data transmission, i.e. not content. A505 (Heegard Decl.) at ¶ 43. That a synchronization signal does not contain "content" is also consistent with the plain and ordinary meaning of the term. A561 (Heegard Sur-Reply Decl.) at ¶ 11. Plaintiff does not explain why this clarification would be problematic, other than its same argument with regards to the term "content."

ways a synchronization signal could maintain a timing relationship between transceiver. As Dr. Heegard explained, "[a] synchronization signal could simply be sent to both devices in the system as a pilot tone" that does not have to be corrected against a reference. A505-06 (Heegard Decl.) at ¶ 44. Second, Plaintiff's proposed narrowing of the plain and ordinary meaning of this claim term falls far short of the "clear intention to limit the claim scope" required to read the claims restrictively. *Innova/Pure Water*, 381 F.3d at 1117.

Finally, Plaintiff's reliance on arguments made by a third party in a separate proceeding is also unavailing. Plaintiff cites to a statement made by a purported expert not retained by Defendants in a proceeding in which Defendants were not involved that "a POSITA knew that a *purpose* of maintaining synchronization is to correct errors or differences that may periodically exist between transceivers." *Supra* at 64 (emphasis added). In context, the statement cited by Plaintiff related to whether the prior art taught the limitations of the '404 patent, not the construction of the term "synchronization signal." *See* A195–A196 (explaining why prior art reference disclosed "synchronization signal" even accepting Dr. Chrissan's "extra limitations" to the term). Furthermore, Plaintiff failed to mention that the opposing party in that proceeding did not agree with and argued against Plaintiff's narrow construction. *See* A190 at 4 ("Since the specification encompasses other forms of timing signals for synchronization and not just a pure tone, a POSITA would have understood that the claims are not limited to correcting errors or differences in the timing references of the transmitter and receiver.").

D. "means responsive to a sleep mode command for: (1) storing selected state parameters characteristic of the communications channel over which the transceiver is operating; and (2) reducing power to selected portions of transceiver circuitry" (recited in the asserted claims of the 753 patent)

Plaintiff's Proposed Construction[53]	Defendants' Proposed Construction
Means plus function limitation. The means language is "means responsive to a sleep mode command for" The functions are: (1) storing selected state parameters characteristic of the communications channel over which the transceiver is operating, and (2) reducing power to selected portions of transceiver circuitry. The structure that corresponds to storing selected state parameters characteristic of the communications channel over which the transceiver is operating is a memory. The structure that corresponds to reducing power to selected portion of transceiver circuitry is a controller implementing (1) an algorithm for a ~~central office ("CO")~~ transceiver that includes the steps of reducing or cutting off power to digital modulator/demodulator portions of the transmitter and receiver sections and reducing power to parts of the analog circuitry, or (2) an algorithm for a ~~customer premises ("CPE")~~ transceiver that includes the steps of reducing power to digital modulator/demodulator circuitry as well as to transmitter data line drivers.	112 para 6 Function: "(1) storing selected state parameters characteristic of the communications channel over which the transceiver is operating in response to a sleep mode command, and (2) reducing power to selected portions of transceiver circuitry in response to a sleep mode command" Structure: "The controller of the <u>first</u> transceiver <u>that</u> receives a sleep mode command and ~~the first transceiver~~ (1) stores its state in its own state memory corresponding to the state memory of the second transceiver, and (2) reduces or cuts off power to the digital modulator/demodulator portions and/or parts of the analog circuitry, as well as to transmitter data line drivers, of the transmitter and receiver sections of the <u>first</u> transceiver"[54]

[53] TQD modifies its proposed construction in hopes of further narrowing the disputed issues. The modifications are shown with deleted words crossed out.

[54] This is a stylistic edit made to clarify Defendants' proposed construction.

1. Plaintiff's Opening Position

The parties agree that this is a means-plus-function ("MPF") limitation and generally agree on the recited functions. The parties disagree on the structure that corresponds to the functions.

TQD's construction points to the correct structure. The structure disclosed in the specification as performing the first recited function of "storing selected state parameters characteristic of the communications channel over which the transceiver is operating" is a memory. The specification explains that it is a "State Memory (SM) 36 connected to the controller 32" that "records the state of the transceiver." A19 (753 patent) at 5:4-5. Similarly, the specification states that the "CO transceiver stores its state in its own state memory corresponding to the state memory 38 of CPE transceiver 10," *see* A19 (753 patent) at 6:58-60, and the CPE transceiver "stores its state . . . in state memory 38." *See* A20 (753 patent) at 7:26-27; A472-73 (Chrissan Decl.) at ¶ 38.

The structure disclosed as performing the second recited function of "reducing power to selected portions of transceiver circuitry" is a controller. The specification explains that the controller 32 controls the operation of the transceiver and that the "power down operation" begins on "receipt of a power down indication . . . by the . . . controller." *See* A18 (753 patent) at 4:50-51,[55] A19 (753 patent) at 5:25-27,[56] 5:43-44,[57] and 6:18-21.[58] Thus, the controller controls the reduction of power to portions of transceiver circuitry. *See* A473 (Chrissan Decl.) at ¶ 39.

[55] "It supplies input to a Controller 32 which controls the individual units of the transmitter."

[56] "The controller 32 also controls the operation of the receiver portion 16 of the transceiver 10."

[57] "Control of the receiver section is provided by the controller 32."

[58] "Referring now more particularly to FIG. 2, the power down operation of the CPE transceiver begins on receipt of a power down indication (step 80) by the CPE transceiver controller 32."

However, because a controller, like a computer or microprocessor, is programmed to carry out an algorithm, the corresponding structure also includes the algorithm the controller implements to perform the claimed function. *See Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008) ("[I]n a means-plus-function claim in which the disclosed structure is a computer[] or microprocessor[] programmed to carry out an algorithm, the disclosed structure is . . . [a] special purpose computer programmed to perform the disclosed algorithm."); *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008) (the specification can express the algorithm "in any understandable terms including as a mathematical formula, in prose, . . . as a flow chart, or in any other manner that provides sufficient structure").

The specification describes embodiments of low power modes for both a CO transceiver and a CPE transceiver. *See* A473 (Chrissan Decl.) at ¶ 40. The claim in which this means-plus-function element is found applies to both a CO transceiver and a CPE transceiver. The specification provides different algorithms for the CO and CPE transceivers for performing the function of reducing power to transceiver circuitry, and, thus, the algorithm portion of the structure must include the algorithm for the CO unit, and, in the alternative, the algorithm for the CPE unit. *See Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) ("[W]hen multiple embodiments in the specification correspond to the claimed function, proper application of § 112, P6 generally reads the claim element to embrace each of those embodiments.").

The algorithm for the CO transceiver is as follows:

> [T]he CO transceiver . . . may, at this time, perform its own power reduction. In particular, it may reduce or cut off power to the digital modulator/demodulator portions of its transmitter and receiver sections (corresponding to the IFFT 20 and FFT 56 of the CPE transceiver, FIG. 1); this provides a significant power reduction. Further, it may reduce power to parts of the analog circuitry.

A20 (753 patent) at 7:6-12; A473 (Chrissan Decl.) at ¶ 40.

> The algorithm for the CPE transceiver is as follows:
>
> The CPE transceiver 10 then reduces power to the digital modulator/demodulator circuitry comprising IFFT 20 and FFT 56, as well as to [the] transmitter data line drivers 26.

Id. at 7:35-38; A473 (Chrissan Decl.) at ¶ 40.

Thus, a person of skill in the art would understand that the structure that corresponds to "reducing power to selected portion of transceiver circuitry" is a controller that implements (1) an algorithm for a CO transceiver that includes the steps of reducing or cutting off power to digital modulator/demodulator portions of the transmitter and receiver sections and reducing power to parts of the analog circuitry, or (2) an algorithm for a CPE transceiver that includes the steps of reducing power to digital modulator/demodulator circuitry as well as to transmitter data line drivers. *See* A474 (Chrissan Decl.) at ¶ 41.

Defendants' construction does not identify the correct structure. First, Defendants construction fails to identify the memory as the structure for storing state parameters. As discussed above, however, the specification associates the memory with the claimed function of storing state parameters. A474 (Chrissan Decl.) at ¶ 42. Indeed, in computer implemented inventions, "memory," standing alone (*i.e.*, without reference to an algorithm), would typically be the structure that corresponds to the function of storing in an MPF limitation. *See*, *e.g.*, *Chicago Bd. Options Exch., Inc. v. Int'l Sec. Exch., LLC*, 677 F.3d 1361, 1366-67 (Fed. Cir. 2012) (finding that a "system memory is the disclosed structure clearly associated with 'system memory means'" for "storing allocating parameters").

In addition, Defendants' construction improperly requires that the "first transceiver" perform the algorithm of storing its state in its own state memory "corresponding to the state

memory of the second transceiver." While the specification does state, with respect to just the CO, that the transceiver stores its state in its own state memory "corresponding to the state memory of the CPE transceiver," *see* A19 (753 patent) at 6:58-60, this is the nomenclature used by the patent to simply convey that the CO has components similar to those of the CPE embodiment illustrated in Figure 1. The addition of "corresponding to the state memory of the CPE transceiver" is therefore unnecessary to, and confusing as part of, the claim construction. Indeed, elsewhere the specification describes storing a state in memory without reference to the memory "corresponding to" the memory of a second transceiver. *See id*. at 5:4-6;[59] A20 (753 patent) at 7:25-27.[60] As such, even if Defendants are correct in arguing that the structure corresponding to the function of "storing selected state parameters characteristic of the communications channel over which the transceiver is operating" includes an algorithm – which they are not – the algorithm recited in Defendants' construction is improper.

Furthermore, Defendants' construction mistakenly combines elements of the two different algorithms provided in the specification for reducing power to the circuitry of the CO and CPE transceivers into a single algorithm. In that regard, Defendants' algorithm requires reducing or cutting off power to transmitter data line drivers, even though the specification refers to reducing power to data line drivers of the CPE transceiver – not the CO transceiver. *See* A20 (753 patent) at 7:6-10,[61] 7:35-38.[62] The specification describes "reducing power to parts of the

[59] "Finally, a State Memory (SM) 36 connected to the controller 32 records the state of the transceiver for reasons discussed more fully below."

[60] "[T]he CPE transceiver enters the sleep mode (step 92). In particular, it stores its state (step 94) in state memory 38 . . . ."

[61] "[The CO transceiver] may, at this time, perform its own power reduction. In particular, it may reduce or cut off power to the digital modulator/demodulator portions of its transmitter and receiver sections (corresponding to the IFFT 20 and FFT 56 of the CPE transceiver . . . ."

analog circuitry" of the CO transceiver. While reducing power to "parts of the analog circuitry" of the CO transceiver *may* include reducing power to line drivers, it does not have to include reducing power to line drivers. As a result, Defendants' construction incorrectly fails to account for the CO transceiver embodiment and, thus, for this additional reason, is overly narrow. *See* A474 (Chrissan Decl.) at ¶ 42.

2. Defendants' Answering Position

Defendants' construction accurately states the full claimed function and the corresponding structure disclosed in the specification. *See Frank's Casing Crew & Rental Tools, Inc. v. Weatherford International, Inc.*, 389 F.3d 1370, 1376 (Fed. Cir. 2004) ("A means- plus-function limitation requires a court first to identify the claimed function and then to determine the structure in the specification that corresponds to that function."). With respect to the function, Defendants' construction stays true to the words of the claim, including the requirement that the claimed means is "*responsive to a sleep mode command* for: (1) storing selected state parameters characteristic of the communications channel over which the transceiver is operating; and (2) reducing power to selected portions of transceiver circuitry."

With respect to the structure, the specification discloses very little description that can be likened to an algorithm, if at all. In an interest to streamline the case, however, Defendants have attempted to identify a potential algorithm disclosed in the specification. Yet, in view of Plaintiff's arguments regarding the corresponding structure of this term, it is apparent that the disclosure in the specification that Defendants painstakingly tried to gather in hopes of finding

[62] "The CPE transceiver 10 then reduces power to the digital modulator/demodulator circuitry comprising IFFT 20 and FFT 56, as well as to and transmitter data line drivers 26."

some form of algorithm is, in fact, not an algorithm at all. Thus, under Plaintiff's construction, this limitation is certainly indefinite for lack of structure.

Defendants' proposed structure, accurately reflects the corresponding disclosure of the specification with respect to the claimed functions. The specification states that "the power down operation of the CPE transceiver begins on receipt of a power down indication (step 80) by the CPE transceiver controller 32" or "it may be responsive to a power down command from the CO transceiver". A19 ('753 patent) at 6:18–29; *see* A20 at 7:24–26 ("In response to the "Entering Sleep Mode" notification from the CO transceiver, the CPE transceiver enters the sleep mode (step 92)."). Further, the response sets off a series of actions that must include "storing" and "reducing power." The specification provides the chain reaction for both ends of the system. Thus, a POSA would also understand that the specification provides that the claimed function occurs in response to a signal that commands the transceiver to go into sleep mode. A506-07 (Heegard Decl.) at ¶ 48.

With respect to the structure for the function of "storing selected state parameters characteristic of the communications channel over which the transceiver is operating in response to a sleep mode command," the specification states that "the CPE transceiver transmits an 'Entering Sleep Mode' notification (step 86) . . . . The CO transceiver detects this notification . . . and enters sleep mode . . . [and] stores its state in its own state memory corresponding to the state memory 38 of CPE transceiver 10." A19 ('753 patent) at 6:52–60. Thus, Defendants' construction verbatim recites the corresponding language from the specification, i.e., that the transceiver "stores its state in its own state memory corresponding to the state memory of the

second transceiver."[63] A507-08 (Heegard Decl.) at ¶ 49-50. Similarly, "[i]n response to the 'Entering Sleep Mode' notification from the CO transceiver, the CPE transceiver enters the sleep mode (step 92). In particular, it stores its state (step 94) in state memory 38; as noted above in connection with the CO transceiver." A20 ('753 patent) at 7:24–27. Plaintiff argues that "Defendants [sic] construction fails to identify the memory as the structure," however, Defendants' construction plainly recites a "state memory." *Supra* at 73. Plaintiff also cites to a case that involves unrelated patents with different claim languages that is of little probative value. *Id.*

Plaintiff's arguments regarding Defendants' construction are without merit. Plaintiff argues that Defendants "improperly require[] that the 'first transceiver' perform the algorithm of storing its state in its own state memory 'corresponding to the state memory of the second transceiver'" and that the specification is "simply convey[ing] that the CO has components similar to those of the CPE" and thus the language is "unnecessary" or confusing. However, Defendants are merely regurgitating what the specification explicitly discloses. *Supra* at 73. Plaintiff chose to be bound by the disclosure of the specification by reciting a means-plus-function limitation. The fact that the disclosure in the specification corresponding to that function is nonsensical or unfavorable to Plaintiff now is of no moment.[64]

[63] Instead of specifying the transceivers as the CO and CPE transceivers, Defendants identify them generically as first and second transceivers.

[64] Defendants reserve the right to allege different claim construction arguments and invalidity defenses, including indefiniteness arguments, in response to any terms of the '753 patent because Plaintiff has not served any infringement charts whatsoever against Defendants with respect to the '753 patent. Thus, Defendants are left to guess as to what Plaintiff may assert in its infringement contentions.

With respect to the structure corresponding to Plaintiff's proposed function of "reducing power to selected portions of transceiver circuitry in response to a sleep mode command," the specification states the following:

> It may, at this time, perform its own power reduction. In particular, it may reduce or cut off power to the digital modulator/ demodulator portions of its transmitter and receiver sections (corresponding to the IFFT 20 and FFR 56 of the CPE transceiver, FIG. 1); this provides a significant power reduction. Further, it may reduce power to parts of the analog circuitry.

A20 ('753 patent) at 7:6–12. Thus, the transceiver also reduces power to portions of the circuitry. The specification also states that "[t]he CPE transceiver 10 then reduces power to the digital modulator/demodulator circuitry comprising IFFT 20 and FFT 56, as well as to the transmitter data line drivers 26." *Id.* at 7:35–38. Whether or not the transceiver is a CPE or CO does not matter because the specification provides that the CPE embodiments can also be applied to CO transceivers and simply reverse the positions.[65] A508-09 (Heegard Decl.) at ¶ 51. Thus, Plaintiff's argument that "Defendants' construction mistakenly combines elements of the two different algorithms" is plainly contradicted by the specification. *See supra* at 74.

Plaintiff's construction is inaccurate because it (1) fails to clearly address the responsiveness to a sleep mode command; (2) states it is an algorithm for performing the function without providing any actual algorithm; and (3) isolates the construction between a CO transceiver and a CPE transceiver when the specification clearly calls only for a transceiver with a controller and state memory.

[65] Although the specification uses CPE and CO, it also clarifies that "the CPE transceiver and CO transceiver are very similar" and "the invention will be explained in connection with a detailed illustration of the CPE transceiver only." A21 ('753 patent) at 4:2–4; see also id. at 8:29–33 ("For example, instead of initiating sleep mode at the CPE transceiver as shown in FIG. 2, the CO transceiver may initiate sleep mode. In such a case, the flow of notifications will be as shown in FIG. 2, but with the positions of CO and CPE transceivers reversed.").

First, Plaintiff's construction fails to clearly address the full scope of the function with regard to responsiveness to a sleep mode command. Plaintiff's construction broadens the claim by only requiring a function of "storing selected state parameters" and "reducing power to selected portions of . . . the circuitry." Plaintiff does state that the "means language is 'means responsive to a sleep mode command,'" but does not require that as part of the language of the proposed function or structure. *Supra* at 70. Thus, Plaintiff's construction merely requires the structure store the selected state parameters and reducing power. By omitting reference to "responsive to a sleep mode command," Plaintiff's construction could cover situations where those functions occur even without a preceding sleep mode command. This is improper. *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) ("The statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim."). Therefore, Plaintiff's construction is too broad and is incorrect.

Second, Plaintiff's proposed structure with respect to the function of reducing power is "an algorithm for a [CO or CPE] transceiver that includes the steps of," but proceeds to only recite functional language. Plaintiff states the algorithm is the steps of "reducing or cutting off power to" certain portions of the transceiver circuitry. That is not an algorithm, as it is essentially restating Plaintiffs' proposed function of "reducing power to selected portions of transceiver circuitry." Plaintiff's arguments are filled with conclusory statements that merely state there is a general purpose computer with an algorithm. *Supra* at 71. The purported algorithms Dr. Chrissan points to do not provide any structure for the first function of "storing selected state parameters . . ." and merely recites the same function of reducing power that's stated in the claim. A473 (Chrissan Decl.) at ¶ 40 (stating that "*it may reduce or cut off power* to the digital modulator/demodulator portions of its transmitter and receiver sections (corresponding to the

IFFT 20 and FFT 56 of the CPE transceiver, FIG. 1); this provides a significant power reduction. Further it may reduce power to parts of the analog circuitry."). The disclosure is not an algorithm; instead, this is circular logic. A508-09(Heegard Decl.) at ¶ 51. Indeed, Plaintiff's inclusion of the phrase "algorithm for" as part of the proposed structure is indicative of the fact that there is no structure. To include a general undefined algorithm as part of the structure would broaden the claim beyond what was provided in the specification, and makes it indefinite.

Third, as discussed above, Plaintiff's construction unnecessarily isolates the claim to situations involving a CO transceiver and a CPE transceiver, when the specification explicitly calls for them to be interchangeable. The specification states that "the CPE transceiver and CO transceiver are very similar" and although the invention is explained according to the CPE transceiver, it may also apply to the CO transceiver. A21 ('753 patent) at 4:2–4; *see also* A23 ('753 patent) at 8:29–33. A POSA would have understood that the specification allowed for the CO and the CPE to be interchanged and therefore, the naming conventions of CO and CPE could be replaced with a first and second transceiver designation to encompass the invention. A508-09 (Heegard Decl.) at ¶ 51. A POSA would understand that it is not necessary that the CO operate in one manner and the CPE operate in another. *Id.* Therefore, Plaintiff's construction is too narrow in that respect and thus incorrect.

3. Plaintiff's Reply Position

a) Defendants are Wrong About Reading "Responsive to a Sleep Mode Command" into The Function

Defendants err in arguing that the construction of this MPF limitation should include reference to the phrase "responsive to a sleep mode command for." *Supra* at 75. In support of their argument, Defendants point to the use of the phrase in the claim and to portions of the specification describing "receipt of a power down indication" and "respon[ding] to a power

down command." *Supra* at 76. Defendants also assert that, by not addressing the phrase "responsive to a sleep mode command," TQD's construction is too broad. *See id*. All of these points miss the mark.

The claimed functions of the limitation are the words that follow the phrase "means responsive to a sleep mode command for." The "responsive to a sleep mode command" language clearly modifies the word "means," not the subsequent functional language. As such, it is improper to read that language into the function as Defendants do. *See Lockheed Martin Corp. v. Space Systems/Loral, Inc.*, 324 F.3d 1308, 1319 (Fed. Cir. 2003) ("[t]he function is properly identified as the language after the 'means ***for***' clause"); *Intergraph Corp. v. Intel Corp.*, No. 2:01-CV-160, 2002 U.S. Dist. LEXIS 27117, at *16 (E.D. Tex. June 3, 2002) ("The . . . 'responsive to' phrase . . . is descriptive of the 'means,' but is not part of the function performed by the 'means.'"); *Alt v. Medtronic, Inc.*, No. 2:04-CV-370, 2005 U.S. Dist. LEXIS 44928, at *12-14 (E.D. Tex. Nov. 30, 2005) (rejecting proposal that the function of "means responsive to said detected movements indicative of physical exercise for incrementally adjusting the rate of said pacemaker according to the level of said physical exercise" includes "responsive to said detected movements indicative of physical exercise").[66] Because TQD's construction includes structure – a memory and a controller that runs algorithms – that corresponds to the correctly identified claimed functions, *i.e.*, those following the word "for," it is not overly broad.

[66] *See also Lucent Techs., Inc. v. Newbridge Networks Corp.*, 168 F. Supp. 2d 181, 197 (D. Del. 2001) (finding that function of MPF limitation does not include "responsive" clause following the word "means"); *In re Rembrandt Techs., LP Patent Litig.*, No. MDL 07-MD-1848(GMS), 2008 WL 5773604, at *3 (D. Del. Nov. 19, 2008) (same).

b) Defendants Fail to Show That TQD's Structure is "Indefinite"

Defendants also argue that "under TQD's construction," the MPF limitation is "certainly indefinite for lack of structure." *Supra* at 76. This argument has no merit. TQD identifies the structure of a memory and the structure of a controller configured to run one of two algorithms, and such structure is unquestionably adequate. *See Chicago Bd.*, 677 F.3d at 1367-68 (finding that a "system memory is the disclosed structure clearly associated with 'system memory means'" for "storing allocating parameters"); *Aristocrat Techs.*, 521 F.3d at 1333 ("[I]n a means-plus-function claim 'in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is . . . the special purpose computer programmed to perform the disclosed algorithm.'"). Indeed, Defendants do not explain how or why the structure TQD identifies is indefinite.

c) Defendants Are Wrong About the Structure for the "Storing Selected State Parameters" Function

Defendants incorrectly identify the structure for the function of "storing selected state parameters characteristic of the communications channel over which the transceiver is operating" as the controller and an algorithm. As explained above, the specification clearly discloses a "memory" as the structure that stores parameters. *See supra* at 71 (citing A19-20 (753 patent) at 5:4-5, 6:58-60, 7:26-27). Courts routinely find that a "memory" is the corresponding structure for a "means for storing" limitation. *See Adobe Sys. v. Macromedia, Inc.*, 201 F. Supp. 2d 309, 318 (D. Del. 2002) ("[T]he Court concludes that the structure corresponding to the 'means for storing a sound waveform' is a 'computer memory . . . and equivalents thereto.'"); *Mettler-Toledo, Inc. v. Fairbanks Scales Inc.*, 551 F. Supp. 2d 576, 584-87 (E.D. Tex. 2008) (finding that the structure corresponding to "means for storing a mathematical expression for load corrected for load position" is a "memory embedded in a master controller, and equivalent structures"). As

such, Defendants are incorrect in identifying a "controller + algorithm" as the corresponding structure.

Perhaps realizing their reliance on an algorithm is misplaced, Defendants further contend that their construction "plainly recites a 'state memory'" as structure. *See supra* at 77. This argument is specious. Defendants' construction recites a "state memory" as part of the algorithm that Defendants identify as the structure. This is not the same as identifying the memory as the structure. Again, because the specification discloses the structure of a memory as storing the state parameters – and not a general purpose computer – Defendants' recitation of an algorithm – even an algorithm that refers to a memory as part of the series of steps – is not correct.[67]

Defendants take issue with TQD's argument that Defendants' construction is overly narrow because it recites "stor[ing] its state in its own state memory *corresponding to the state memory of the second transceiver*." *Supra* at 77. Defendants assert that they are "merely regurgitating what the specification explicitly discloses" and that TQD "chose to be bound by the disclosure of the specification by reciting a means-plus-function limitation." *Id*. The portion of the specification that Defendants "regurgitate" in their construction, however, relates to just one embodiment, the CO. A19 (753 patent) at 6:52-60. As mentioned above, the specification elsewhere discloses the CPE storing its state in memory without reference to "correspondence to" the memory of another transceiver. *See supra* at 71 (citing A19-20 (753 patent) at 5:4-6, 7:25-27). Therefore, Defendants chose to "regurgitate" into their construction the narrowest

[67] Defendants also half-heartedly argue that one of the cases TQD cites in support of its argument that "memory" is the correct structure (*Chicago Bd. Options Exch., Inc. v. Int'l Sec. Exch.*) is "of little probative value." *Supra* at 77. That case, along with *Adobe Sys. v. Macromedia, Inc.* and *Mettler-Toledo, Inc. v. Fairbanks Scales Inc.*, also cited by TQD, are right on point – they are decisions where a court found that a memory is the structure that corresponds to "means for storing" language.

description in the specification for storing a state in memory. This is not proper. The structure of an MPF limitation should cover all embodiments disclosed in the specification as relating to the claimed function. *See Micro Chem.*, 194 F.3d at 1258 ("[W]hen multiple embodiments in the specification correspond to the claimed function, proper application of § 112, P6 generally reads the claim element to embrace each of those embodiments.").[68]

d) Defendants Are Wrong About the Structure for the "Reducing Power" Function

While the parties agree that the structure that relates to the function of "reducing power to selected portions of transceiver circuitry" is a controller that performs an algorithm, there is a dispute about the algorithm. As Defendants acknowledge, the specification discloses two different algorithms (one for the CO and one for the CPE) that correspond to the "reducing power" function. *See supra* at 78; *supra* at 72 (citing A20 (753 patent) at 7:6-12, 7:35-38). The algorithm recited in Defendants' construction, however, requires steps that the specification describes only the CPE as performing, *i.e.*, reducing or cutting off power to the line drivers. In response to TQD's argument that such a construction is improper because it does not cover the CO embodiment, Defendants argue that it does not matter "because the specification provides that the CPE embodiments can also be applied to CO transceivers and simply reverse the positions." *Supra* at 78.

Defendants' argument is off point. Even if the two different algorithms by which the CPE and CO reduce power are swapped or are interchangeable in the way Defendants allege, the

[68] In a footnote, Defendants claim to reserve the right to allege different claim construction arguments with respect to the 753 patent because TQD has not served infringement charts for the 753 patent. *See supra* at n.64. It would seem to defeat the purpose of the current claim construction schedule in this case to allow parties to submit new claim construction arguments at a later date.

MPF limitation still must be construed to cover both algorithms – which TQD's construction does. Put another way, if the "reducing power" algorithms of the CO and CPE are swapped, then it is the CO that reduces or cuts off power to the line drivers, and it is the CPE that is not required to reduce power to the line drivers. As such, Defendant's construction – which requires reducing or cutting power to data line drivers – still would not cover one of the embodiments – in this case, the CPE embodiment. *See* A549 (Chrissan Reply Decl.) at ¶ 19.

Defendants err in arguing that TQD's proposed structure for the function of reducing power does not constitute "structure" because it is an "undefined" algorithm that "only recite[s] functional language" and is "circular logic" that restates the function of "reducing power to selected portions of transceiver circuitry." *Supra* at 79. First, as discussed above, the case law is clear that the "structure" of an MPF limitation that recites functions that are described in the specification as being done by a general purpose computer (such as a "controller") is not "physical" structure but is an algorithm that the computer runs. *See Aristocrat Techs.*, 521 F.3d at 1333; *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1367 (Fed. Cir. 2008); *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). TQD's structure follows this case law. Therefore, Defendants' cavil about TQD's construction not providing any structure is baseless.

Second, TQD's structure/algorithms are not "undefined" or "circular logic" and do not just "restate the claimed functions." TQD's algorithms include details about the specific circuitry for which power is reduced and the extent of the reduction that are not found in the claimed functional language, such as "cutting off power to digital modulate/demodulator portions," reducing power "to parts of the analog circuitry," and reducing power to "transmitter data line drivers." These details provide a POSA with information necessary to perform the

claimed function of "reducing power to selected portions of transceiver circuitry." *See* A548-49 (Chrissan Reply Decl.) at ¶ 18. That is all that is needed. *See AllVoice Computing PLC v. Nuance Commc'ns., Inc.*, 504 F.3d 1236, 1245 (Fed. Cir. 2007) ("In software cases . . . algorithms in the specification need only disclose adequate defining structure to render the bounds of the claim understandable to one of ordinary skill in the art."); *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1385 (Fed. Cir. 2011) ("[A] patentee [may] express that procedural algorithm in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure."); *Cellular Commc'ns. Equip. LLC v. HTC Corp.*, No. 6:13-cv-507, 2015 U.S. Dist. LEXIS 28718, at *23 (E.D. Tex. Mar. 9, 2015) ("[T]he patentee need not disclose every conceivable detail or implementation of an algorithm, so long as some algorithm is disclosed.").

Defendants further make the puzzling argument that the algorithms TQD and its expert point to do not provide any structure for the first recited function of "storing selected state parameters . . . ." *Supra* at 79. That is because the structure that corresponds to that function does not involve algorithms. As already explained, the structure that performs the function of "storing state parameters" is a memory, not a general purpose computer. As such, under *Aristocrat* and its progeny, it is not necessary to identify an algorithm as the structure corresponding to that function.

Lastly, Defendants argue that TQD's construction "unnecessarily isolates the claim to situations involving a CO transceiver and a CPE transceiver, when the specification . . . calls for them to be interchangeable" and that a "POSA would understand that it is not necessary that the CO operate in one manner and the CPE operate in another." *Supra* at 80 TQD addresses this concern by modifying its construction such that each recited algorithm is not limited to one of

the CO and CPE. In this way, both of the different algorithm embodiments disclosed in the specification are accounted for, but the construction does not require that the "CO operate in one manner and the CPE operate in another."

4. Defendants' Sur-Reply Position

a) "Responsive To" Is Part of the Means-Plus-Function Limitation

Plaintiff agrees that "responsive to a sleep command" modifies the claimed means, but argues that it should not be part of the construction. It appears as though Plaintiff agrees that "responsive to a sleep mode command" modifies the claimed means, but it then provides a structure and a function that removes this modifier. Ultimately, a jury is going to be tasked with determining (1) whether the accused device performs the specified function and (2) whether the accused structure is the same or equivalent to the structure identified in the patent for performing the function. Defendants are not assigning some new meaning to the phrase "responsive to a sleep mode command" or suggesting that it necessitates some new or different structure, but are instead including it in the proposed claim construction so that the requirement does not disappear altogether when the jury is asked to determine whether the accused products satisfy this claim limitation.

b) Plaintiff Does Not Provide Any Structure for "Reducing Power"

"Section 112, ¶ 6 of Title 35 of the United States Code permits an applicant to express a claim limitation as a means or step for performing a specified function without claiming the structure that performs the function." *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 948 (Fed. Cir. 2007). This broad claiming ability comes at a cost, however: "in return for generic claiming ability, the applicant must indicate in the specification what structure constitutes the means." *Id.* "'If the specification is not clear as to the structure that the patentee intends to

correspond to the claimed function, then the patentee has not paid the price but is rather attempting to claim in functional terms unbounded by any reference to structure in the specification.'" *Id.* (quoting *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003)). Expert testimony "'cannot supplant the total absence of structure from the specification.'" *Id.* (quoting *Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1302 (Fed. Cir. 2005)). "Accordingly, a bare statement that known techniques or methods can be used does not disclose structure." *Id.* at 953.

Plaintiff's alleged structure for the term "reducing power to selected portions of transceiver circuitry" fails to meet the requirement that the claimed function corresponds to structure that is actually disclosed in the specification and cannot be based on expert testimony or the knowledge of one of ordinary skill in the art. As a result, Plaintiff's construction lacks clarity, as its proposed structure is merely a rephrasing of the function itself with the addition of the phrase "an algorithm." An algorithm in the abstract is not structure; if Plaintiff wants to rely upon a disclosed algorithm, it needs to point to the series of steps or operations disclosed in the specification that constitute an algorithm. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1352 (Fed. Cir. 2015) ("The algorithm may be expressed as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure."). Here, Plaintiff merely recites "the same specified function" of "reducing power" and "does not set forth an algorithm for performing the claimed functions," which renders the claims unclear and also insufficient under *Williamson*.[69] *Id.* at 1352–53. Thus, Plaintiff's construction should be rejected.[70]

[69] Plaintiff's reliance on pre-*Williamson* cases fails to address this clear deficiency in Plaintiff's construction under *Williamson*. *Supra* at 88.

[70] Plaintiff's argument that a "controller" should not be included is also unavailing. *Supra* at 84. The cases Plaintiff cites involve unrelated technology. To the extent such cases have any

c) Defendants' Construction Does Not Exclude Any Embodiment

Plaintiff argues that "Defendants' construction [] requires steps that the specification describes only the CPE as performing." *Supra* at 84. Plaintiff is wrong. Defendants' construction covers the CPE embodiment, where "[t]he CPE transceiver 10 then reduces power to the digital modulator/demodulator circuitry comprising IFFT 20 and FFT 56, as well as to the transmitter data line drivers 26." A20 ('753 patent) at 7:35–38. Consistent with this disclosure, Defendants' construction states that the controller "reduces or cuts off power to the digital modulator/demodulator portions . . . as well as to transmitter data line drivers."

E. "means responsive to a wake-up command for: (1) restoring power to said transceiver; (2) restoring the state of said transceiver from said sleep mode by means of said stored parameters" (recited in the asserted claims of the 753 patent)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Means plus function limitation. The means language is "means responsive to a wakeup command for" The functions are: (1) restoring power to said transceiver, and (2) restoring the state of said transceiver from said sleep mode by means of said stored parameters. The structure that corresponds to performing the functions is a controller implementing (1) an algorithm for a CO transceiver that includes the steps of retrieving the CO's stored state from its memory and restoring full power to its	112 para 6 Function: "restoring power to said transceiver and restoring the state of said transceiver from said sleep mode by using said stored parameters in response to a wake-up command" Structure: "The first transceiver *that*[71] receives a wake-up command and in response transmits an exiting sleep mode signal to the second transceiver, retrieves its stored state from the state memory, restores full power to its circuitry, and restores the output of the Fast Fourier Transform to the input of the phase-

relevance, it is that the constructions were supported by the intrinsic evidence. Here, the inclusion of controller is supported by the specification. *See, e.g.,* A6 ('730 patent) at 4:62-64 ("[A] State Memory (SM) 36 connected to the controller 32 records the state of the transceiver. . . ."); A7 ('730 patent) at 6:12-15 ("[T]he power down operation of the CPE transceiver begins on receipt of a power down indication (step 80) by the CPE transceiver controller 32.").

[71] This is a stylistic edit made to clarify Defendants' propose construction.

circuitry, or (2) an algorithm for a CPE transceiver that includes the steps of retrieving the CPE's stored state from its memory and restoring full power to its circuitry.	lock loop."

1. Plaintiff's Opening Position

The parties agree that this is an MPF limitation and generally agree on the recited functions. The parties, however, disagree on the structure that corresponds to the functions.

TQD proposes that the controller is the structure that corresponds to the functions of restoring power to the transceiver and restoring the state of the transceiver from the sleep mode by means of the stored parameters. Again, the specification explains that the controller 32 controls the operation of the transceiver,[72] and, thus, the controller controls the restoration of the power and state of the transceiver. *See* A474-75 (Chrissan Decl.) at ¶ 43.

Moreover, the specification provides an algorithm that the controller runs to restore the power and the state of the CO and CPE transceivers. In particular, the specification explains that the CPE transceiver "retrieves its stored state from the state memory 38; restores full power to its circuitry" and that the CO transceiver "restor[es] its state and restor[es] power." A20 (753 patent) at 7:55-62. In addition, the flow chart at Figure 2 of the specification shows that, for both the CPE and CO, the steps taken by the transceiver include "Restore State" and "Restore Power." *See* A15 (753 patent) at Fig. 2. Thus, the algorithms for the CPE and CO transceiver are very similar. *See* A475 (Chrissan Decl.) at ¶ 44.

Accordingly, the structure that corresponds to "restoring power to said transceiver" and "restoring the state of said transceiver from said sleep mode by means of said stored parameters" is properly understood to be a controller implementing (1) an algorithm for a CO transceiver that

[72] *See* A18 (753 patent) at 4:50-51 and A19 (753 patent) at 5:25-27; 5:43-44 (quoted *supra* at 71).

includes the steps of retrieving the CO's stored state from its memory and restoring full power to its circuitry, or (2) an algorithm for a CPE transceiver that includes the steps of retrieving the CPE's stored state from its memory and restoring full power to its circuitry. *See id*. at ¶ 45.

Defendants' construction misses the mark at least because the algorithm in Defendants' construction is not the right one. First, Defendants improperly read the requirement of "in response transmits an exiting sleep mode signal to the second transceiver" into the algorithm. The claimed functions of restoring the power and the state of the transceiver, however, are not achieved by transmitting an exiting sleep mode signal – they are achieved, as discussed above, by retrieving the transceiver's stored state from its memory and restoring full power to its circuitry. *See id*. at ¶ 46. In addition, the specification discusses transmitting an exiting sleep mode signal with respect to only the CPE transceiver. *See* A20 (753 patent) at 7:59-62;[73] A15 (753 patent) at Fig. 2. Therefore, by including the requirement of transmitting an exiting sleep mode signal to a second transceiver, Defendants' algorithm improperly excludes the operation of the CO transceiver and, thus, is overly narrow. *See* A475-76 (Chrissan Decl.) at ¶ 46.

Second, Defendants' construction adds the requirement that the wakeup command is received by the transceiver. This requirement, however, is based on a misunderstanding of the specification. Indeed, the wakeup command that initiates the restoration of power to the transceiver *may* originate from a communication transmitted between two transceivers, *see* A20 (753 patent) at 7:48-50,[74] but it may also originate on the same side of the communication link, for example, from a computer attached to the transceiver or when the transceiver itself detects

[73] "The CO transceiver, on detecting the 'Exit Sleep Mode' notification from the CPE transceiver (step 99), there upon exits sleep mode by restoring its state and restoring power."

[74] "During the sleep mode state, the CO transceiver continues to monitor (step 90) the data subscriber line 14 for an 'Exiting Sleep Mode' signal from the CPE transceiver (step 96)."

that it as data to send. *See id*. at 7:50-55.[75] *See* A476 (Chrissan Decl.) at ¶ 47. This is true for both the CO transceiver and CPE transceiver embodiments. *See id*. at 8:27-33.[76]

Lastly, Defendants' algorithm improperly reads in the requirement of "restor[ing] the output of the Fast Fourier Transform to the input of the phase-lock loop." While the specification describes the CPE transceiver "restor[ing] the output of the FFT 56 to the input of the PLL 62" in response to an "Awaken" signal, that step is separate from, and in addition to, the steps of restoring power and the state. *See* A20 (753 patent) at 7:55-59;[77] A476 (Chrissan Decl.) at ¶ 47. "Restoring the output of the FFT to the input of the PLL" has nothing to with restoring power to the transceiver or restoring the state of the transceiver by means of stored parameters. Moreover, the specification describes only the CPE transceiver as "restoring the output of the FFT 56 to the input of the PLL 62." *See* A476 (Chrissan Decl.) at ¶ 47. Therefore, reading that step into the algorithm as Defendants do would result in the claim limitation not covering the CO transceiver embodiment. *See id*.

Accordingly, for at least the above reasons, Defendants' MPF construction is incorrect.

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[75] "The CPE transceiver transmits this signal when its controller receives an 'Awaken' indication (step 98) from an external source such as a computer in which it is installed or from other sources, or when its controller detects the presence of new data in the input buffer 18."

[76] "It will be understood that the order of certain of the steps described above may be changed, and that some steps may be omitted or added. For example, instead of initiating sleep mode at the CPE transceiver as shown in FIG. 2, the CO transceiver may initiate sleep mode. In such a case, the flow of notifications will be as shown in FIG. 2, but with the positions of CO and CPE transceivers reversed."

[77] "In response to the 'Awaken' signal, the CPE transceiver retrieves its stored state from the state memory 38; restores full power to its circuitry; and restores the output of the FFT 56 to the input of the PLL 62 (step 96)."

2. Defendants' Answering Position

The Parties agree that the "means responsive to a wake-up command for . . ." limitation is a means-plus-function limitation. However, similar to the "means responsive to a sleep mode command . . ." limitation discussed above, Defendants' construction requires that the functions occur in response to a wake-up command. Defendants' construction also complies with the only embodiment provided in the specification. On the other hand, Plaintiff's construction attempts to ignore that the functions necessarily occur in response to a wake-up command, and again merely proposes a generic unidentified "algorithm for" performing the function, i.e., it merely restates the function.

Much like with the "means responsive to sleep mode command . . ." limitation discussed above, the specification discloses very little that can be likened to an algorithm with respect to the "means responsive to a wake-up command for . . ." limitation. In the interest of streamlining the case, Defendants attempted to identify something resembling an algorithm, but again, in view of Plaintiff's arguments regarding the corresponding structure of this term, it is apparent that the disclosure in the specification does not provide an algorithm. Plaintiff's proposed structure merely recites the function and is no algorithm at all. That is, Plaintiff's propose structured of "an algorithm for a [CO or CPE transceiver] . . . [for] retrieving the [CO's or CPE's] stored stated from its memory and restoring full power to its circuitry" is merely restating the proposed function of "(1) restoring power to said transceiver," which would include circuitry, and "(2) restoring [i.e., retrieving] the state of said transceiver from said sleep mode by means of said stored parameters." Thus, according to Plaintiff's own construction, it is apparent that this limitation is also indefinite for lack of structure.

Defendants' proposed structure complies with the only embodiment provided in the specification, and acknowledges the interchangeability of the CO and CPE by using "first" and

"second" transceiver. The specification states that "[i]n response to the 'Awaken' signal, the CPE transceiver retrieves its stored state from the state memory 38; restores full power to its circuitry; and restores the output of the FFT 56 to the input of the PLL 62 (step 96)." A20 ('753 patent) at 7:55–59; A510 (Heegard Decl.) at ¶ 55. Although the specification states the CPE, the structure is also applicable to the CO. *See, e.g.,* A20 ('753 patent) at 8:29–33. The next sentence for this embodiment is the result of the first transceiver (CPE), sending the "Exit Sleep Mode" notification, where the CO transceiver "exits sleep mode by restoring its state and restoring power." *Id.* at 7:59–62. The embodiment requires all of the steps as a whole, each of which is required in the only disclosure for awakening the transceiver. *See Franks Casing Crew*, 389 F.3d at 1378 (finding the pivot limitation required a lift plate located under the boom, otherwise the device could not perform the stated function); *Budde v. Harley-Davidson Inc.*, 250 F.3d 1369, 1379 (Fed. Cir. 2001) ("The specification must be read as a whole to determine the structure capable of performing the claimed function.").

Plaintiff attempts to break up these steps into CO or CPE only steps, while ignoring the co-dependence of the transceivers in the specification and the specification's clear instruction that the CO and CPE transceivers are interchangeable. Plaintiff and Dr. Chrissan take great effort to break up the disclosure provided in the specification and present the only steps for waking the transceivers as "restor[ing] the state" and "restor[ing] the power." *Supra* at 90; A475 (Chrissan Decl.) at ¶¶ 44–45. Plaintiff cites the same passage and figure that Defendants cite (*supra* at 90), yet fails to present all the steps disclosed in the only embodiment provided in the specification. Instead, Plaintiff picks and chooses which steps to include in its proposed structure, forgetting that the structure of a means plus function is determined by the full disclosure in the specification and not simply what Plaintiff would like to pick and choose to meet the function. *See Epcon Gas*

Systems, Inc. v. Bauer Compressors, Inc., 279 F.3d 1022, 1032 (Fed. Cir. 2002) ("Construction of a means plus function limitation requires identification of the function recited in the claim and a determination of what structures have been disclosed in the specification that correspond to the means for performing that function.").

Plaintiff's omission of "in response to a wake up command" impermissibly broadens the claim. The claim itself requires the transceiver to receive a wake-up command, and then the remaining actions occur. Without the wake-up command, the remaining actions do not occur. A510-11 (Heegard Decl.) at ¶¶ 57-58. Defendants do not argue that the wake-up command has to originate from a particular place, as Plaintiff wrongly accuses, *see supra* at 91, but there must be a wake-up command first. Indeed, Plaintiff asserts as an example a situation where the wake-up command originates "from a computer attached to the transceiver," which would result in the transceivers receiving the wake-up command from the attached computer. *Id.*

And in response to that wake-up command, the specification states the first transmitter transmits an exiting sleep mode signal to the second transceiver, retrieves its stored state from the state memory, restores full power to its circuitry, and restores the output of the Fast Fourier Transform to the input of the phase-lock loop. A20 ('753 patent) at 7:55–59. Plaintiff argues that "restor[ing] the output of the Fast Fourier Transform to the input of the phase-lock loop" is a separate step and should not be included (*supra* at 92), however, this disclosure indicates the resumption of operations that directly relate to the restoration of power, i.e., power becomes needed as these operations resume. A510 (Heegard Decl.) at ¶ 55.

Therefore, Defendants' structure is correct.

3. Plaintiff's Reply Position

a) Defendants are Wrong About Reading "Responsive to a Wake-Up Command" into The Function

Defendants start by erroneously stating that the function of this MPF limitation must include the language about being responsive to a wake-up command. *Supra* at 93. As discussed above, courts routinely find that when an MPF limitation recites language like a "means responsive to a wake-up command for," the phrase "responsive to a wake-up command" modifies the word "means" and is not part of the claimed function. As such, Defendants' inclusion of "in response to a wake-up command" in their function is improper, and TQD does not "ignore that the functions necessarily occur in response to a wake-up command" by failing to include the "response to a wake-up command" language in its construction. *Supra* at 93.

b) Defendants Are Wrong about the Corresponding Structure

Defendants criticize TQD's proposed structure as merely "restating the proposed function." *Supra* at 93. TQD's structure, however, is based on the algorithm disclosed by the specification for performing the claimed function. While that algorithm is similar to the function, it is not a restatement of the function. The algorithm explains that the function of "restoring power to said transceiver" is done by restoring full power to the circuitry of the transceiver, and that the function of "restoring the state of said transceiver from the sleep mode by means of said parameters" is done by retrieving the stored state from the transceiver's memory.[78] Thus, TQD's algorithm provides the specific details for the algorithm that must be run to perform the claimed functions. *See* A550 (Chrissan Reply Decl.) at ¶ 22. That is all that

[78] Defendants apparently agree because their algorithm includes steps that are almost identical to those found in TQD's algorithm, *viz*. "retriev[ing] its stored state from the state memory [and] restor[ing] full power to its circuitry."

the algorithm need do, and there is nothing wrong with an algorithm being similar to the claimed function. *See*, *e.g.*, *Cellular Commc'ns.*, 2015 U.S. Dist. LEXIS 28718, at *25 (finding that, for the function of "associating a specific value of said set of specific parameter values indicated by one of said index with the corresponding second parameter of a neighbor cell," the corresponding structure is "a microprocessor . . . configured to indicate a parameter value of a neighbor cell by using an index, or a pointer, to identify a parameter value, or set of parameter values").

In defense of their construction, Defendants argue that their structure complies with the only embodiment provided in the specification. *Supra* at 93. Not so. Defendants' structure includes "and in response transmit[ting] an exiting sleep mode signal to the second transceiver." First, transmitting an exiting sleep mode signal does not "restore power" or "restore the state of said transceiver . . . by means of said stored parameters." *See* A549-50 (Chrissan Reply Decl.) at ¶ 21. As such it is not structure corresponding to those claimed functions. Moreover, the specification only discloses one of the transceivers (the CPE) transmitting the exit sleep mode signal. *See* A20 (753 patent) at 7:59-62; A15 (753 patent) at Fig. 2. Of course, even if the CO and CPE are reversed in Figure 2, only one of the transceivers transmits the exit sleep mode signal – the other one receives it. Thus, by requiring the structure to include "transmitting an exiting sleep mode signal," Defendants' structure excludes one of the transceiver embodiments disclosed in the specification. *See* A549-50 (Chrissan Reply Decl.) at ¶ 21. Accordingly, the inclusion of "transmitting an exiting sleep mode signal to the second transceiver" in Defendants' construction renders it too narrow.

Defendants further take aim at TQD's construction by arguing that TQD "attempts to break up" the steps of its algorithm "into CO or CPE only steps, while ignoring the co-

dependence of the transceivers in the specification and the specification's clear instruction that the CO and CPE transceivers are interchangeable." *Supra* at 94. To start with, TQD "breaks up" its algorithm into two steps, one for a CO and one for a CPE, because that's what the specification does. MPF constructions are supposed to encompass all embodiments that perform the claimed functions, and the specification discloses two transceivers, a CO and CPE, that each perform the claimed functions of restoring power and restoring state. Accordingly, any construction of this MPF limitation should cover both transceivers – as TQD's does. *See* A549 (Chrissan Reply Decl.) at ¶ 20.

Furthermore, to the extent Defendants are talking about exit sleep mode signals being sent between the CO and CPE when they refer to the "co-dependence of the transceivers," *see* A20 (753 patent) at 7:48-50, TQD is correct in not referring to the signals in its construction. Those signals may be involved in telling a transceiver that it is time to wake up, but they are not part of the steps that perform the claimed functions of restoring power and restoring state.

Defendants also contend that TQD's construction fails to include in its algorithms all the steps disclosed in the specification. *Supra* at 94. In that regard, Defendants argue that TQD improperly omits "in response to a wake-up command" from its construction. *Id*. at 95. As discussed above, that language modifies the word "means" and is not part of the claimed function.

Defendants further argue that the structure should include the step of "restor[ing] the output of the Fast Fourier Transform to the input of the phase-lock loop." *Supra* at 95. As explained above, this step does not "restore power to the transceiver" or "restore the state of the transceiver from the sleep mode by means of the stored parameters." *See supra* at 92 (citing A20 (753 patent) at 7:55-59; A476 (Chrissan Decl.) at ¶ 47). As such, it should not be included in any

algorithm that corresponds to those claimed functions. Defendants fail to adequately respond to this point. Instead, Defendants talk around it by saying that including the "restoring the output of the FFT" step in their algorithm is appropriate because it "indicates resumption of operations that directly relate to the restoration of power, i.e., power becomes needed as these operations resume." *Supra* at 95. A step that indicates resumption of operations related to restoration of power, however, still does not actually restore power. At best it is a step that results from the restoration of power. *See* A476 (Chrissan Decl.) at ¶ 47.

4. Defendants' Sur-Reply Position

Defendants maintain that "responsive to" should be part of the construction for the same reasons as discussed above for Section VI.D.1.

Plaintiff's construction again lacks clarity and instead of including a clear structure in its construction, it claims "an algorithm" that explains how to perform the function. Plaintiff argues that "[t]he algorithm explains that the function of 'restoring power to said transceiver' is done by restoring full power to the circuity of the transceiver." *Supra* at 96. Plaintiff does not provide where in the specification it discloses how or what steps are taken to "restor[e] power." Plaintiff's construction is unclear and also fails under *Williamson*. *See Williamson*, 792 F.3d at 1352–53. Therefore, Plaintiff's construction should be rejected.

F. "means for maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates[, to thereby facilitate restoration of communication without reinitialization of said transceiver]" (recited in the asserted claims of the 753 patent)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Means plus function limitation. The means language is "means for" The function is maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with	112 para 6 Function: "maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates, to thereby facilitate restoration of communication without

which it communicates. The structure that corresponds to performing the function is a clock and frame counter.	reinitialization of said Transceiver" Structure: Indefinite

1. Plaintiff's Opening Position

There is no dispute that this is an MPF limitation. There is a dispute, however, with respect to the function and to the structure.

For its part, TQD proposes that the function is just "maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates." In contrast, Defendants contend that the function is not only that language, but the "thereby" clause that follows that language. The "thereby" clause, however, is an additional claim limitation – it is not a function performed by the claimed means. *United Video Properties v. Amazon.com, Inc.*, No. 11-003, 2012 U.S. Dist. LEXIS 86914, at *27 (D. Del. June 22, 2012) ("Amazon's proposed construction improperly appends the subsequent 'wherein' clause to the function. . . . [T]he 'wherein' clause does not modify the function. Instead, it states a separate limitation that acts on the result: the indication."); A477 (Chrissan Decl.) at ¶ 49.

Turning to the structure part of the construction, the specification explains that a clock and frame counter are used to "maintain[] a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates." In that regard, the specification states a "Frame Counter (FC) 24 connected to the controller maintains a count of the number of frames of data transmitted from or received by the transceiver 10. The clock 30 maintains the count in counter 34 synchronous with that of a corresponding counter . . . in the CO transceiver." A18 (753 patent) at 4:59-63 (emphasis added). The specification also describes how the clock 30 of the CPE transceiver is "in synchronism with the Master Clock" of the CO transceiver, which "synchronizes frame counter 34 of the CPE transceiver to the

corresponding frame counter of the CO transceiver." A19 (753 patent) at 5:40-43 (emphasis added). Thus, a person of skill in the art would know from the specification that the transceiver's clock and frame counter are used to maintain a common, synchronized data frame count with another transceiver. *See* A476-77 (Chrissan Decl.) at ¶ 48.

Defendants contend that the structure is indefinite. As discussed above, the specification is clear as to what the corresponding structure is. *See* A477 (Chrissan Decl.) at ¶ 50. In any event, Defendants have not yet explained why the structure is indefinite. If and when an explanation is provided, TQD will respond accordingly.

2. Defendants' Answering Position

Both parties agree that the term is a means plus function limitation; however, Defendants contend the term is indefinite.

"If a patentee 'employs means-plus-function language in a claim, [the patentee] must set forth in the specification an adequate disclosure showing what is meant by that language.'" *Advanced Ground Info. Sys. Inc. v. Life360, Inc.*, 830 F.3d 1341, 1349 (Fed. Cir. 2016) (quoting *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382 (Fed. Cir. 2009)). The specification fails to adequately disclose the structure corresponding to this claimed function. The specification mainly states that a functional "black box" type "Frame Counter (FC) connected to the controller maintains a count of the number of frames." A18 ('753 patent) at 4:59–63; *see also* A19 ('753 patent) at 5:40–43 (referencing a clock and frame counter). A frame counter is not a common term used by a POSA, and the frame counter is merely described as performing the same function described within the claim itself. A511-12 (Heegard Decl.) at ¶ 60. This is not a real structure. This is a function being described by a function. *Id.*

Although the specification discloses a general clock and an ambiguous frame counter, the specification fails to address how the two actually maintain a common, synchronized data frame

count between said transceiver and a remote transceiver with which it communicates. *Id.*; *see also Advanced Ground Info. Sys*, 830 F.3d at 1349 ("A patentee cannot claim a means for performing a specific function and subsequently disclose a 'general purpose computer as the structure designed to perform that function' because this 'amounts to pure functional claiming.'"). Therefore, the "means for maintaining a common, synchronized data frame count . . ." is indefinite, because there is no structure (i.e., algorithm) disclosed. Notably, Plaintiff and its expert do not assert that there is any algorithm disclosed.

With respect to the function, Plaintiff asserts that the language after the "thereby" clause is an additional claim limitation and not a function performed by the claimed means. *Supra* at 100. However, the claim itself says that it is a means for "maintaining a common, synchronized data frame count . . . to thereby facilitate restoration of communication without reinitialization." This language is part of the same function, because it relates to the function of "facilitat[ing] restoration." A512 (Heegard Decl.) at ¶ 61.

The case Plaintiff relies on is inapposite as it involves different claim language and context. The limitation at issue in *United Video Properties v. Amazon.com, Inc.,* No. 11-003,2012 U.S. Dist. LEXIS 86914, at *27 (D. Del. June 22, 2012), recited "means for indicating that a video clip preview is available for a video-on-demand program that is associated with a video-on-demand program listing *wherein the indication is provided with the video-on-demand program listing*." The language following the "wherein" clause in *United Video* is not functional. To the contrary, the claim language at issue recites a functional feature, i.e., to facilitate restoration of communication without reinitialization." Furthermore, to the extent Plaintiff proposes that the requirement of "facilitat[ing] restoration of communication without reinitialization of said transceiver" is not tied to the claimed "means for maintaining a common,

synchronized data frame count . . . ," Plaintiff's proposed construction is overbroad as it omits a specific connection in the claim language itself.

3. Plaintiff's Reply Position

a) A POSA Would Have Known that a Frame Counter is "Real Structure"

In support of their argument that the limitation is indefinite, Defendants assert that the frame counter TQD identifies as part of the structure is not a common term used by a POSA and is not "real structure." *Supra* at 101. Not true.

First, "counters" and the idea of "counting" frames have been known in the art for a long time. *See* A550-51 (Chrissan Reply Decl.) at ¶ 23. For example, the American National Standards Institute (ANSI) T1.413-1995 Standard (the "1995 ADSL Standard") discloses, under the heading "Superframe Counting," how "[e]ach transmitter shall increment its counter after sending each ADSL superframe" and that "each receiver shall start its counter . . ., and then increment it after receiving each superframe." A356 (1995 ADSL Standard) at 113. As another example, U.S. Patent No. 6,912,261, which has a 1994 priority date, teaches frame synchronization in ADSL multicarrier transmission systems, and, as part of that frame synchronization, discloses that a "counter may be provided" for determining whether "a loss of frame synchronization" has occurred. *See* A447 (U.S. Pat. No. 6,912,261) at 9:21-26.

Moreover, a POSA would have understood that the term "frame counter" is interchangeable with the well-known term "symbol counter." A551 (Chrissan Reply Decl.) at ¶ 24. The 1995 ADSL Standard explains that "DMT symbol, or frame, boundaries are delineated by the cyclic prefix inserted by the modulator" and that "[s]uperframe boundaries are determined by the synchronization symbol." *See* A267 (1995 ADSL Standard) at 24. Thus, the ADSL Standard uses the terms "frame" and "symbol" interchangeably and explains that they have

boundaries and are part of a superframe. A551 (Chrissan Reply Decl.) at ¶ 24. This is consistent with the specification, which explains that "a symbol [is] commonly referred to as a . . . 'frame'" and that "[i]n DSL systems . . . data is communicated in the form of a sequence of data frames (e.g., sixty-eight frames for ADSL . . .), followed by a synchronization frame, each frame having a duration of one symbol period . . . . Together, the sixty-nine frames comprise a 'superframe'. Thus, the counter 34 typically maintains a count modulo sixty-nine [*i.e.*, it counts 1 through 69 then starts again]." A17 (753 patent) at 1:65-66; A18-19 (753 patent) at 4:59-5:4. Thus, a POSA would understand that a frame (or symbol) counter counts the frames/symbols of a superframe so that the transceiver knows when 69 frames/symbols (and thus an entire superframe) have been transmitted or received. A551 (Chrissan Reply Decl.) at ¶ 24.

"Symbol counters" were well known in the art by the priority date of the Family 7 Patents. A552 (Chrissan Reply Decl.) at ¶ 25. Indeed, the 1995 ADSL Standard teaches that "[s]ynchronization of the mutual training begins with the transmission of R-REVERB1 . . . and is maintained throughout training by both transceivers counting the number of symbols from that point on." A336 (1995 ADSL Standard) at 93. As another example, U.S. Patent No. 5,400,322, which was filed in 1993, discloses an ADSL multicarrier transmission system that includes a "transmitted symbol counter for counting transmitted symbols" and a "received symbol counter for counting received symbols." A433 (U.S. Pat. No. 5,400,322) at 3:53-60.

Accordingly, a POSA would have equated the "frame counter" disclosed in the specification with the well-known structure of a "symbol counter." A552 (Chrissan Reply Decl.) at ¶ 25. Therefore, a POSA would have known that what the specification means by "frame counter" and would have known that it is "real structure." *Id*.

In addition, Defendants' argument that a "frame counter" is not a common term is based solely on a conclusory statement made by its expert. *See* A511-12 (Heegard Decl.) at ¶ 60. Moreover, that statement conflicts with other statements in his declaration. At Paragraph 41 of his declaration, Defendants' expert recognizes that a "frame counter" can be used with a pilot tone to synchronize a system and relies on the disclosure of the "frame counter" in the specification to support his position that a "POSA would understand that there are various ways to implement a synchronization signal to establish or maintain a pilot tone." *See* A504 (Heegard Decl.) at ¶ 41. If a "frame counter" was not a recognizable structure to a POSA, how does Defendants' expert know that it can be used in one of various ways to synchronize a system?

b) A POSA Would Have Understood How the Clock and Frame Counter Perform the Claimed Function

Defendants argue that the "specification fails to address how" the clock and frame counter actually maintain a common synchronized data frame count between transceivers. *Supra* at 101. This argument is also based on nothing more than a single conclusory statement from Defendants' expert. *See* A511-12 (Heegard Decl.) at ¶ 60. Again, at Paragraph 41 of his declaration, Defendants' expert does not seem to have any problem understanding how a frame counter is used to synchronize a system. *See* A504 (Heegard Decl.) at ¶ 41. Moreover, Defendants' argument conflicts with the detailed teaching in the specification as to how the clock and frame counter maintain a synchronized frame count:

> A Frame Counter (FC) 24 connected to the controller 32 maintains a count of the number of frames of data transmitted from or received by the transceiver 10. The clock 30 maintains the count in counter 34 synchronous with that of a corresponding counter (not shown) in the CO transceiver. In DSL systems, typically, data is communicated in the form of a sequence of data frames (e.g., sixty-eight frames for ADSL as specified in ITU Document G.992.2), followed by a synchronization frame, each frame having a duration of one symbol period of approximately two hundred and fifty microseconds. Together, the sixty-nine frames comprise a "superframe". Thus, the counter 34 typically maintains a count modulo sixty-nine.

A18 (753 patent) at 4:59-5:4.

> During normal (non-sleep mode) operation, a phase-lock loop (PLL) 62 receives from the FFT 56 a timing reference signal 62a (see FIG. 1A) via a line 62b. The timing reference signal 62a is transmitted from the transmitter with which the receiver 16 communicates (e.g., the CO transmitter). This signal is advantageously a pure tone of fixed frequency and phase which is synchronized with the Master Clock in the transmitter; its frequency defines the frame rate of the transceivers. Other forms of timing signal may, of course, be used, but use of a pure tone has the advantage of simplicity and reliability even when portions of the transceiver are powered down in accordance with the invention. The PLL 62 locks itself to this signal and drives clock 30 in synchronism with the Master Clock in the driving transmitter. This also synchronizes frame counter 34 of the CPE transceiver to the corresponding frame counter of the CO transceiver.

A19 (753 patent) at 5:28-43.

A POSA reading this description would understand the clock in a first transceiver is in communication with the frame counter of the first transceiver (*see* Fig. 2 (A15)) and is synchronized with the clock in the second transceiver. *See* A552 (Chrissan Reply Decl.) at ¶ 26. By way of this arrangement, the frame counter is synchronized with the frame counter in the second transceiver (which is in communication with the clock in the second transceiver). *Id*. Thus, each transceiver has a frame count that is synchronized with the frame count of the other transceiver, *e.g.*, the count of frames received by the first transceiver is the same as the count of frames send by the second transceiver. *Id*. As such, Defendants are wrong in arguing that the specification does not disclose how the clock and frame counter maintain a common synchronized frame count between transceivers.

Defendants also incorrectly argue that TQD's structure is indefinite because it does not recite the structure of an algorithm. *Supra* at 102. Again, under *Aristocrat* and its progeny, the structure of an MPF limitation may be an algorithm when the only structure disclosed for performing the function is a general purpose computer programmed to carry out an algorithm.

Here, the specification clearly discloses the structure of a clock and a frame counter as performing the claimed function. As such, it would not be necessary or appropriate to include an algorithm in the structure.

c) The "Thereby" Clause is not Part of the Claimed Function

In arguing that the "thereby" clause is part of the claimed function, Defendants make the confusing statement that the "claim . . . is a means for 'maintaining a common synchronized data frame count . . . to thereby facilitate restoration of communication without reinitialization.' This language is part of the same function, because it relates to the function of 'facilitat[ing] restoration.'" *Supra* at 102. Defendants rely on circular logic – the thereby clause (which recites "facilitating restoration") should be part of the claimed function because the clause relates to "facilitating restoration."

Regardless, the fact of the matter is that the thereby clause does not modify, and is not part of, the function of "maintaining a common, synchronized data frame count between said transceiver and a remote transceiver with which it communicates." *See* A553 (Chrissan Reply Decl.) at ¶ 27. The thereby clause is at best a result of the function, *i.e.*, restoration of communication can be done as a result of the maintenance of a common synchronized frame count. *Id.*; *see United Video Properties v. Amazon.com, Inc.*, No. 11-003, 2012 U.S. Dist. LEXIS 86914, at *27 (D. Del. June 22, 2012) ("[T]he 'wherein' clause does not modify the function. Instead, it states a separate limitation that acts on the result: the indication."); *King Pharm. Inc. v. Purdue Pharma, L.P.*, 718 F. Supp. 2d 703, 712-13 (W.D. Va. 2010) ("[A]lthough the 'wherein' clause is clearly an 'inventive' limitation, it is also stating a 'result' of 'sequestering the opioid antagonist in an intact dosage form,' not the method for sequestering the antagonist."). As such, the thereby clause should not be considered part of the claimed function.

Defendants attempt to distinguish *United Video* by arguing that the phrase "wherein the indication is provided with the video-on-demand program listing" from that case is "not functional" whereas the "thereby" clause here is functional. *Supra* at 102. The wherein clause of *United Video* is functional – "the indication is provided." Regardless, Defendants' argument is a red herring. The "wherein" clause of *United Video* – like the "thereby" clause here – describes a result of the preceding functional language. As the case law cited by TQD makes clear, results of a claimed function are not part of the claimed function.

4. Defendants' Sur-Reply Position

a) A "Frame Counter" is Not a Commonly Understood Structure

Plaintiff argues that a "frame counter" is a real structure, but cannot tell the Court what it is. Plaintiff cites to extrinsic evidence to show that "'counters' and the idea of 'counting' things, perhaps including frames, have been known in the art for a long time, and thus a frame counter is a common term." *Supra* at 103. However, Plaintiff cites to two documents that noticeably perform counting in different ways, one by counting a superframe, the other by counting the loss of frame synchronization. *See* A356 (1995 ADSL Standard) at 113 ("The ATU-C and ATU-R transmitters shall start their counters immediately after transmitting C- SEGUE3 and R-SEGUE5…. Each transmitter shall increment its counter after sending each ADSL superframe."); A447 (U.S. Pat. No. 6,912,261) at 9:21–26 ("[A] counter may be provided for requiring repeated failure of the correlation result to exceed the threshold TL in successive synchronizing frames before a loss of synchronization is determined."). This discrepancy in what is counted and how it is counted prove that the term "frame counter" does not represent a commonly known structure. *See also* A511-12 (Heegard Decl.) at ¶ 60.

Lastly, Plaintiff incorrectly asserts that Dr. Heegard contradicts himself because his declaration "recognizes that a 'frame counter' can be used with a pilot tone to synchronize a

system." *Supra* at 105. In reality, Dr. Heegard was simply referring to the statements in the specification, and was not acquiescing in any way suggesting that a "frame counter" was a known structure in the art. A504 (Heegard Decl.) at ¶ 41.

b) The Specification Does Not Provide How the Clock and Frame Counter Perform the Claimed Function

The specification only provides the "Frame Counter (FC) 34 connected to the controller 32 maintains a count of the number of frames of data transmitted from or received by the transceiver 10. The clock 30 maintains the count in counter 34 synchronous with that of a corresponding counter (not shown) in the CO transceiver." A18 ('753 patent) at 4:59–63. The specification does not show how that counter synchronizes with the corresponding counter nor how it uses the clock to do this. It only discloses existence of something called a "frame counter" and a clock that maintains the count synchronous with some other counter. That does not show how to maintain a common, synchronized "data frame ***count***" as claimed.

G. "a synchronizer module that uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode" (recited in the asserted claims of the 730 patent)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
"a class of hardware and/or software structures, including a clock, that generates a synchronization signal or receives and uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode"	112 para 6 Function: using a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode" Structure: Indefinite

Alternative Construction if the Court Finds the Limitation is an MPF Limitation:[79] The function is "using a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode" The structure that corresponds to performing the function is (1) for the CO transceiver, a clock and IFFT, or (2) for the CPE transceiver, a clock and PLL.	Alternative Construction if the Court Finds the Limitation is Not an MPF Limitation: "a hardware component that is operable to use a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode"

1. Plaintiff's Opening Position

a) The Limitation Does Not Invoke § 112, ¶ 6, and the Court Should Adopt TQD's Proposed Construction

The first disagreement between the parties about this limitation is whether it is an MPF limitation. It is not.

First, the limitation does not include the word "means," so "there is a rebuttable presumption that [the limitation is] not means-plus-function." *Sound View Innovations, LLC v. Facebook, Inc.*, No. 16-CV-116, 2017 WL 2221177, at *2 (D. Del. May 19, 2017) (citing *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (*en banc*)). Defendants "bear[] the burden of overcoming the presumption by a preponderance of the evidence." *Id*. (citing *Adv. Ground Info. Sys. v. Life360, Inc.*, 830 F.3d 1341, 1347 (Fed. Cir. 2016)). "The standard is whether the words of the claim are understood by persons of ordinary skill in the art

[79] There is a dispute about whether this limitation invokes § 112, ¶ 6. There was a similar dispute with respect to some of the terms being construed for Patent Family 1, and the Court asked the parties to provide alternative constructions – one MPF construction and one non-MPF construction. Consistent with that instruction, the parties here provide alternative constructions for this limitation.

to have a sufficiently definite meaning as the name for structure." *Secured Structures, LLC v. Alarm Sec. Grp., LLC*, No. 6:14CV930, 2016 WL 7552624, at *3 (E.D. Tex. Aug. 9, 2016) (citing *Williamson*, 792 F.3 at 1349); *see also Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1359-60 (Fed. Cir. 2004) (overruled on other grounds by *Williamson* at 792 F.3d 139) (noting that "[i]t is sufficient if the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function").

Second, it is well established "that the term 'module,' in the context of the telecommunications field, denotes sufficient structure such that § 112, ¶ 6 is not invoked." *Stanacard, LLC v. Rebtel Networks, AB*, 680 F. Supp. 2d 483, 498 (S.D.N.Y. 2010); *see also PalmTop Prods., Inc. v. Lo-Q PLC*, 450 F. Supp. 2d 1344, 1364-65 (N.D. Ga. 2006) (holding that "'[c]ommunications module,' and even 'module,' represents more than a mere verbal construct serving as a 'means for' substitute" and concluding that "'module' connotes definite structure, and when combined with 'communications,' which describes the module's operation, sufficient structural meaning will likely be conveyed to a person of ordinary skill in the art"); *C2 Commc'ns Techs., Inc. v. AT&T, Inc.*, No. 2:06-CV-241, 2008 U.S. Dist. LEXIS 46942, at *34-35 (E.D. Tex. Jun. 13, 2008) (holding, in the context of a telephone calling system patent, that § 112, ¶ 6 is not "invoked by the use of the term 'module'"); *Blast Motion, Inc. v. Zepp Labs, Inc.*, No. 15-CV-700, 2017 U.S. Dist. LEXIS 16549, at *38-56 (S.D. Cal. Feb. 6, 2017) (finding "initial motion recognition module," "data storage module," and "communications module" are not MPF limitations).

Turning to the specific language at issue, a person of skill in the art would understand the recited "synchronizer module" as having a sufficiently definite meaning as the name for

structure. *See* A477-78 (Chrissan Decl.) at ¶ 51. Specifically, that person would recognize that "synchronizer module" connotes structure and, in particular, a class of software and/or hardware components that use a synchronization signal to maintain synchronization between a first transceiver and a second transceiver while at least one component of the first transceiver is in the sleep mode. *See id*. That person would further understand that the software and/or hardware "uses" the synchronization signal to maintain synchronization by either generating such a signal (so that it can be sent to the other transceiver) or by receiving such a signal from the other transceiver and using the signal. *See* A478 (Chrissan Decl.) at ¶ 52. For example, the signal may be generated by an Inverse Fast Fourier Transform ("IFFT") of the CO transceiver and received and used by the phase locked loop (hardware) of the CPE transceiver, while software controls the generation and reception of the signal. *See* A7 (730 patent) at 5:38-46;[80] A8 (730 patent) at 7:1-13;[81] A478 (Chrissan Decl.) at ¶ 52.

A person of skill in the art also would understand from the specification that the "synchronizer module" includes a clock. *See* A478 (Chrissan Decl.) at ¶ 53. In that regard, the specification explains, with respect to the CO transceiver, that a "Clock 30 controls the timing of

[80] "In the sleep mode, the FFT 56 is preferably dormant. Accordingly, the timing reference signal for PLL 62 is provided from the output of the analog to digital converter 52 via a detector 64 which extracts the timing signal from the signal appearing on line 14 during sleep mode. By calculating the DFT of the synchronizing pilot tone[,] Controller 32 controls the switching of the input to PLL 62 between these two sources so that the PLL 62 remains locked to the CO transceiver timing reference."

[81] "[T]he CO transceiver continues to transmit to the CPE transceiver the synchronizing pilot tone *62a*. It may, at this time, perform its own power reduction. In particular, it may reduce or cut off power to the digital modulator/demodulator portions of its transmitter and receiver sections (corresponding to the IFFT 20 and FFT 56 of the CPE transceiver, FIG. 1); this provides a significant power reduction. Further, it may reduce power to parts of the analog circuitry. Power will be maintained, of course, to at least that portion of the analog driver circuitry which transmits the pilot tone and other control signals to the CPE transceiver, and to line circuits required to monitor the line 14 for signals from the CPE transceiver."

the operation of the transmitter 12 . . . [and] typically is a master clock to which a remote transceiver, such as at a subscriber premises, will be synchronized." A6 (730 patent) at 4:39-44 (emphasis added). The specification goes on to explain that synchronization of the transceivers is accomplished by generating a signal in the CO transceiver that "is synchronized with the Master Clock" and to which the phase locked loop of the CPE transceiver "locks itself" in order to "drive[] clock 30 [of the CPE transceiver] in synchronism with the Master Clock in the driving [CO] transmitter." A7 (730 patent) at 5:20-33[82] (emphasis added).

Thus, the limitation of "a synchronizer module that uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver . . ." is not an MPF limitation. Rather, a person of skill in the art would understand that it recites definite structure and means "a class of hardware and/or software structures, including a clock, that generates a synchronization signal or receives and uses a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver . . . ." *See* A478-79 (Chrissan Decl.) at ¶ 54.

As an alternative to their MPF construction, Defendants argue that this limitation should be construed to mean "a hardware component that is operable to use a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep

[82] "During normal (non-sleep mode) operation, a phase-lock loop (PLL) 62 receives from the FFT 56 a timing reference signal 62a (see FIG. 1A) via a line *62b*. The timing reference signal *62a* is transmitted from the transmitter with which the receiver 16 communicates (e.g., the CO transmitter). This signal is advantageously a pure tone of fixed frequency and phase which is synchronized with the Master Clock in the transmitter; its frequency defines the frame rate of the transceivers. Other forms of timing signal may, of course, be used, but use of a pure tone has the advantage of simplicity and reliability even when portions of the transceiver are powered down in accordance with the invention. The PLL 62 locks itself to this signal and drives clock 30 in synchronism with the Master Clock in the driving transmitter."

mode." That construction is not correct. As discussed above, a person of skill in the art would understand that a "synchronizer module" includes a clock. *See* A480 (Chrissan Decl.) at ¶ 58. Furthermore, Defendants' construction is insufficient because it does not specify how the synchronizer module "uses" the synchronization signal. The claimed "transceiver" is not limited to either transmitting or receiving the synchronization signal, and a synchronization signal is "used" differently depending on whether a transceiver is transmitting or receiving the signal. Therefore, any construction of this limitation should clarify how the synchronization signal is "used" in the context of either transmission or reception, as TQD's does. *See id*.

b) Alternatively, If the Court Finds that the Limitation Does Invoke § 112, ¶ 6, the Court Should Adopt TQD's Means-Plus-Function Construction

TQD agrees with Defendants that, if the limitation is found to be an MPF limitation, the function is "using a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode." *See* A479 (Chrissan Decl.) at ¶ 56. Defendants, however, are incorrect in arguing that the corresponding structure is indefinite. As discussed above, the specification clearly explains that clocks are used to synchronize the CO and CPE transceivers. *See id*. The specification also explains that the synchronization between the CO and CPE transceivers is maintained in the sleep mode by the phase locked loop of the CPE transceiver receiving a timing reference signal from the transmitter of the CO transceiver. *See* A7 (730 patent) at 5:38-46 (quoted *supra*); A479 (Chrissan Decl.) at ¶ 56. That signal is generated by the Inverse Fast Fourier Transform ("IFFT") of the CO transceiver. *See* A8 (730 patent) at 7:1-13 (quoted *supra*); A479 (Chrissan Decl.) at ¶ 56.

Accordingly, the structure that corresponds to the function of "using a synchronization signal to maintain synchronization between said multicarrier transceiver and a second

multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode" is (1) for the CO transceiver, a clock and an IFFT, or (2) for the CPE transceiver, a clock and a PLL. *See* A479 (Chrissan Decl.) at ¶ 56. Because the specification clearly discloses this corresponding structure, the limitation is not "indefinite" as Defendants contend. *See id*. at ¶ 57. Regardless, Defendants have not explained why the structure is indefinite. If and when an explanation is provided, TQ will respond accordingly.

2. Defendants' Answering Position

a) "Synchronizer Module" Does Not Connote A Structure And Is Therefore Subject to § 112, ¶ 6

The term "synchronizer module" does not describe or connote a specific structure, but merely recites "abstract elements 'for' causing actions" and therefore invokes § 112, ¶ 6. *See Advanced Ground Info.*, 830 F.3d at 1347–48 (holding "symbol generator" to invoke means plus function treatment). The synchronizer module is not an actual structure and it is not used in common parlance by a POSA. A512 (Heegard Decl.) at ¶ 62; *see also Williamson,* 792 F. 3d at 1350 ("'Module' is a well-known nonce word that can operate as a substitute for 'means'" and finding "distributed learning control module" to be a means plus function limitation). The claimed synchronizer module is thus defined by the recited function of "us[ing] a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode." Although the term is not phrased with the word "means," the synchronizer module still relies on functional language to describe the performance of the function, and is therefore subject to 35 U.S.C. § 112, ¶ 6. *See Sound View Innovations LLC v. Facebook Inc.*, No. 16-cv-116 (RGA), 2017 WL 2221177, at *2 (D. Del. May 19, 2017) (stating that the rebuttable presumption for terms not phrased with "means" "can collapse when a limitation lacking the term 'means'

nonetheless relies on functional terms rather than structure or material to describe performance of the claimed function").

Plaintiff's proposed construction makes abundantly clear that "synchronization module" is not a term that connotes specific structure. Rather than identifying any known structures or even reasonably defined class of structures, Plaintiff invokes a "class of hardware and/or software structures" that are then only limited by the function they will be called on to perform. Thus, their purported structure of the claimed module "a class of software and/or hardware components that use a synchronization signal to maintain synchronization . . . in the sleep mode, *supra* at 112, is purely functional, no structure is identified. Plaintiff's reliance on "a *class* of software and/or hardware components" exemplifies that a synchronizer module is merely an "abstraction that describes the function being performed" because the *class* is defined by the function and not an actual structure. *Advanced Ground Info.,* 830 F.3d at 1348 ("Accordingly, because the term "symbol generator" does not describe anything structural, the district court was correct to conclude that the asserted claims which recite the term "symbol generator" are subject to 35 U.S.C. § 112, ¶ 6."); *see also Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1373 (Fed. Cir. 2015) ("Nothing in the written description of the [patent] adds sufficiently to the meaning of the term's structure; it only describes the term's function and interaction with other parts in the system."). Therefore, synchronizer module is subject to 35 U.S.C. § 112, ¶ 6.

b) "Synchronizer Module" Is Indefinite

The parties agree as to the function when construed as a means plus function limitation. However, as there is no structure the term is indefinite. Defendants' arguments regarding the lack of structure corresponding to "means for maintaining a common, synchronized data frame count . . . to thereby facilitate restoration of communication without reinitialization of said transceiver" is similarly applicable here, because the no algorithm for performing the function is disclosed in the

specification. A512-13 (Heegard Decl.) at 63. The specification merely discloses a synchronizing signal. *Id.* The synchronizing signal may keep the transceivers in synchronization, but it is unclear how the synchronizer module uses the synchronization signal "to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode." *See Media Rights Tech.*, 800 F.3d at 1376 ("Because these functions are computer- implemented functions, moreover, the structure disclosed in the specification must be more than a general purpose computer or microprocessor.").

Tellingly, the only way Plaintiff can describe the synchronizer module is to use functional language already provided in the claim itself. This is circular logic. Plaintiff merely points to disclosure relating to the synchronization signals. A512-13 (Heegard Decl.) at ¶ 63; *see Aristocrat Techs. Australia Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1334 (Fed. Cir. 2008) (finding the specification only disclosed an outcome and not a means for achieving that outcome, and was therefore a function and not a structure). This also renders "synchronization signal" superfluous as it becomes synonymous with "synchronization module." Therefore, synchronizer module is indefinite.

c) Alternative Construction

In the alternative, if the language is not subject to § 112, ¶ 6, the limitation should be construed as "a hardware component that is operable to use a synchronization signal to maintain synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in sleep mode." A513 (Heegard Decl.) at ¶ 64. This language follows the language in the claim; the only disclosure provided for

the synchronizer module. *Id.* The specification does not provide an algorithm nor does it clearly provide a structure. At most, the specification provides signals to use as synchronization signals.

Plaintiff's construction is incorrect as it calls for "a class of hardware and/or *software*." Software is nowhere disclosed or discussed in the specification. Plaintiff's construction is also incorrect because it refers to generating a synchronization signal, which is contrary to the language in the claim. *Id.* The claim language states "uses a synchronization signal to maintain synchronization" and does not refer to "generating a synchronization signal." Plaintiffs have disclosed a general sending of a synchronization signal, but not the use of that signal with a synchronizer module. For at least these reasons, Plaintiff's construction is incorrect.

3. Plaintiff's Reply Position

a) "Synchronizer Module" Connotes Structure and is not Subject to § 112, ¶ 6

The absence of "means" in the claim language creates a rebuttable presumption that § 112, ¶ 6 does not apply. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348-49 (Fed. Cir. 2015). Defendants have not carried their burden to rebut that presumption.

In that regard, Defendants' scattershot arguments as to why "synchronizer module" does not connote structure have no merit. They cite to a Federal Circuit case, *Advanced Ground Info. Sys. Inc. v. Life360, Inc.*, that found that the term "symbol generator" invokes MPF treatment. *Supra* at 115. They do not explain how that is germane to the term "synchronizer module" here. They cite *Williamson* for its statement that "module" "**can** operate as a substitute for 'means," but do not explain how the specific analysis of *Williamson* warrants a finding that the "synchronizer module" here operates as a substitute for "means."[83] *Id*. They also fail to address

[83] In a pre-*Williamson* decision, *M2M Sols. LLC v. Sierra Wireless Am., Inc.*, this Court found that "processing module" and "programmable interface" were not subject to Section 112, ¶ 6.

any of the myriad cases TQD cited above that found that the term "module" does not invoke MPF analysis. *See supra* at 111. And since TQD served its Opening Brief, this Court has rendered another decision in which it found that the word "module" does not invoke § 112, ¶ 6. *See Alex Is the Best, LLC v. BLU Prods., Inc.*, No. 16-769-RGA, 2017 WL 5031638, at *6-8 (D. Del. Nov. 3, 2017).

Defendants also argue that "synchronizer module" must be an MPF limitation because it is "defined by the recited function" that follows it and because it is not used in common parlance by a POSA.[84] *Supra* at 115. The surrounding claim language, however, can be used to help determine structure. *See Alex*, 2017 WL 5031638 at *7 ("An adjective . . . can give sufficient structure to a word like 'module' . . . ."). Moreover, as explained above, a POSA viewing the intrinsic evidence (including the specification and the surrounding claim language) would have recognized that "synchronizer module" connotes structure like software and/or hardware that is known in the art, that the task performed by the synchronizer module is straightforward, and that the specification makes clear that the software/hardware uses the synchronization signal by generating a signal with an IFFT and receiving the signal with a PLL. *See supra* at 112 (citing A477-78 (Chrissan Decl.) at ¶¶ 51-52).

2013 WL 5981336, at *3-4 (D. Del. Nov. 12, 2013), *adhered to on reconsideration*, No. CV 12-30—RGA, 2015 WL 5826816 (D. Del. Oct. 2, 2015). In the aftermath of *Williamson*, this Court reconsidered its pre-*Williamson* constructions of those terms and affirmed them. *M2M Solutions LLC*, No. CV 12-30-RGA, 2016 WL 1298961, at *5-6 (D. Del. March 31, 2016). Thus, this Court correctly recognized that *Williamson* did not hold that the word "module" is necessarily a nonce word that cannot define sufficient structure.

[84] In support of this argument, Defendants cite *Sound View Innovations, LLC v. Facebook, Inc.*, No. 16-cv-116, 2017 WL 2221177 at *2 (D. Del. May 19, 2017). In that case, however, the Court did not actually find that a claim term that does not include the word "means" is an MPF limitation.

Defendants criticize the "class of hardware and/or software structures" language in TQD's construction as not being a "reasonably defined class of structures" and being "defined by the function." *Supra* at 116. First, other courts have found that a "module" connotes the structure of software and/or hardware and that such structure is adequate. *See Stanacard, LLC v. Rebtel Networks, AB*, 680 F. Supp. 2d 483, 499-500 (S.D.N.Y. 2010). Second, Defendants' critique of "a class of hardware and/or software structures" ignores the fact that TQD's construction also includes a clock and further explains that the hardware and/or software generates a synchronization signal and receives and uses a synchronization signal. Thus, TQD's construction is "reasonably defined" because a POSA would know that the structure is a kind of software/hardware and clock that can be used together to generate a synchronization signal and receive and use a synchronization signal. Such structure would not be beyond the ken of a POSA. *See* A553-54 (Chrissan Reply Decl.) at ¶ 29.

b) "Synchronizer Module" is not Indefinite

If the Court were to find that this limitation is an MPF limitation, Defendants are wrong in arguing that there is no structure and the limitation is indefinite. First, Defendants' argument appears to be based on the belief that an algorithm must be the structure that corresponds to the claimed function for this limitation and that the specification does not disclose any such algorithm. *Supra* at 116. Defendants again misread *Aristocrat* and its progeny. An algorithm is appropriate structure for an MPF limitation when the structure disclosed in the specification as performing the function is a general purpose computer. Where other computer components are disclosed as performing a function, the structure is those components, not a general purpose computer that runs an algorithm. *See*, *e.g.*, *Levine v. Samsung Telcoms. Am., LLC*, No. 2:09-CV-372, 2012 U.S. Dist. LEXIS 13528, at *53 (E.D. Tex. Feb. 3, 2012) ("[S]pecial-purpose hardware is disclosed, such as the video image signal transmitter or, alternatively, the ultrasonic

generator 84, detector transducer 82, retroreflector 79, converter 81, as well as the image selector circuit/processor 24. As a result, no algorithm is required."); *Hangartner v. Intel Corp.*, No. 3:14-CV-00141-MO, 2014 WL 7228992, at *7 (D. Or. Dec. 17, 2014) ("The phrase 'common synchronization means coupled to all of the nondeterministic logic elements for synchronizing operation of the nondeterministic logic elements' has the function of 'synchronizing operation of the nondeterministic logic elements,' and its corresponding structure is 'signal 32, and delay element 64.'").

Here, the specification clearly discloses computer structures that perform the function of using a synchronization signal to maintain synchronization between first and second transceivers while a component of one of the transceivers is in the sleep mode. As explained above, that structure includes the clocks of the transceivers and, in the case of the CO, an IFFT (which generates a synchronization signal used for maintaining synchronization) and, in the case of the CPE, a PLL (which receives and uses the synchronization signal to maintain synchronization). *See supra* at 112 (citing A7-8 (730 patent) at 5:38-46, 7:1-13; A479 (Chrissan Decl.) at ¶¶ 56-57).

Defendants critique TQD's proposed structure by saying that TQD "use[s] functional language already provided in the claim itself" and "point[s] to disclosure relating to the synchronization signals." *Supra* at 117. This argument is confusing because TQD's proposed structure does not use functional language or refer to a "synchronization signal" – TQD's proposed structure is a clock, IFFT, and a PLL. *See* A553 (Chrissan Reply Decl.) at ¶ 28. To the extent Defendants argument is directed to TQD's non-MPF construction of "synchronization module," it seems to be in the wrong place in Defendants' brief. Regardless, for the reasons already discussed above, TQD's non-MPF construction includes structure and is not just

functional language. In addition, nothing in that construction "renders 'synchronization signal' superfluous" or "synonymous with 'synchronization module.'" *Supra* at 117. A class of hardware and/or software structures that generates a synchronization signal or receives and uses a synchronization signal is not the same thing as a synchronization signal.

c) Alternative Construction

Defendants assert that their non-MPF construction "follows the language of the claim" because the claim is the "only disclosure" for the "synchronizer module" and the specification does not provide a structure. *Supra* at 117. For reasons already discussed above, that is incorrect. A POSA would have understood what "synchronizer module" means (and what structure it includes) based on the specification and knowledge of the art. Defendants also state that the specification does not disclose structure for the "synchronizer module" because it does not provide an algorithm and, at best, only discloses signals used for synchronization. *Id*. As discussed above, there is no need to point to an algorithm as structure when the claim is not a general computer implemented MPF limitation, and the specification does provide enough disclosure (including with respect to timing reference signals) to support TQD's proposed construction.

Defendants further assert that TQD's construction is incorrect because the specification does not disclose software. *Supra* at 118. This criticism does not hold water. Certainly, a POSA, upon reviewing the specification of the Family 7 Patents, would recognize that software could be used to implement the disclosed inventions. *See* A553-54 (Chrissan Reply Decl.) at ¶ 29. And more specifically, as discussed above, a POSA would readily understand that a synchronizer module could include software that uses a synchronization signal to maintain synchronization between transceivers. *See supra* at 112 (citing A477-78 (Chrissan Decl.) at ¶¶ 51-52).

Lastly, Defendants' argument that TQD's construction is incorrect because it refers to "generating a synchronization signal" but the claim recites "using a synchronization signal" is of no moment. *Supra* at 118. As TQD explained above, its construction clarifies that a POSA would have understood that "using a synchronization signal" to maintain synchronization between two transceivers involves one transceiver generating the synchronization signal, ***e.g.***, with an IFFT, and the other transceiver receiving and using the synchronization signal, ***e.g.***, with a PLL. *See supra* at 112 (citing A477-78 (Chrissan Decl.) at ¶¶ 51-52; A7-8 (730 patent) at 5:38-46, 7:1-13); A553-54 (Chrissan Reply Decl.) at ¶ 29. Defendants do not dispute that that is how the claimed signal would be used to maintain synchronization.

4. Defendants' Sur-Reply Position

a) "Synchronizer Module" is Only Described by Its Function

Plaintiff wrongly asserts that Defendants' only basis for finding the "synchronizer module" subject to 35 U.S.C. § 112, ¶ 6 is the word "module."[85] This is not so. The entire claim language in question is in a "format consistent with traditional means-plus-function claim limitations." *Williamson*, 792 F.3d at 1350. Like in *Williamson*, the claim replaces the term "means" with the term "module" and then recites a function of "maintain[ing] synchronization between said multicarrier transceiver and a second multicarrier transceiver while said at least one component of said multicarrier transceiver is in the sleep mode." The specification does not even use the term "synchronization module" and, thus, provides no clear link to a structure in the specification for the function. Moreover, the fact that a POSA "could program a computer to

[85] Plaintiff cites to cases involving unrelated patents that are not binding in this Court and do not discuss a "synchronization module" as provided here. All but one of the cases were prior to *Williamson*.

perform the recited functions cannot create structure where none otherwise is disclosed." *Williamson*, 792 F.3d at 1351. The "synchronizer module" is properly subject to section 112, ¶ 6.

Plaintiff further adds that merely providing an adjective can provide sufficient structure. *Supra* at 119 (quoting *Alex Is the Best LLC v. BLU Products Inc.*, 2017 WL 5031638, *7 (D. Del. Nov. 3, 2017). However, in *Alex* extrinsic evidence showed that the claimed modules were structural components of standard digital photography equipment at issue. *Alex*, 2017 WL 5031638, at *7. The scenario in the instant case is different, however, as one of ordinary skill in the art would not understand a "synchronizer module" to connote definite structure in the same way that "optical module" does in the field of digital photography equipment and in the context of those claims.

Plaintiff's own construction defines the synchronizer module by its function, stating generically that it is "a class of hardware and/or software structures" that is described based on its ability to carry out the function. Plaintiff's statement is meaningless: ***everything*** in the field of the patent can be categorized as either a hardware or software structure. And even when Plaintiff attempts to provide structural specificity beyond "a class of hardware and/or software structures," its proposed structure gives two different structures for the same term. Plaintiff's attempt to define the structure of a "synchronizer module" with disparate, alternate hardware belies its theory that a "synchronizer module" is known structure.

b) Synchronizer Module is Indefinite

When Plaintiff attempts to provide the claimed structure for this term under § 112, ¶ 6, its own analysis reveals why the term is indefinite. First, in its brief, Plaintiff asserts that the structure is "(1) for the CO transceiver, a clock and IFFT, or (2) for the CPE transceiver, a clock and PLL." *Supra* at 110. In contrast, Dr. Chrissan suggests the "synchronizer module" is all three

combined. A553 (Chrissan Reply Decl.) at ¶ 28. Plaintiff's inability to even internally agree on a single structure as the "synchronizer module" should be fatal to this term.

H. "state parameters characteristic of the communications channel over which the transceiver is operating" (recited in the asserted claims of the 753 patent)

I. "at least one parameter representative of an operating mode" (recited in the asserted claims of the 730 patent)

J. "at least one parameter representative of a full power mode" (recited in the asserted claims of the 382 patent)

K. "at least one parameter associated with the full power mode operation" (recited in the asserted claims of the 404 patent)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
For Limitation H: "state parameters used by the transceiver for transmission and/or reception of data" For Limitations I-K: "at least one parameter associated with the transmission and/or reception of data during [operating mode / full power mode]"	For Limitations H-K: "A parameter(s) [representative /characteristic / associated with] of an [communication channel / operating mode / state / full power mode] that is established by initialization"

1. Plaintiff's Opening Position

Due to some similarity in the language of Limitations H-K, the parties agreed to treat those limitations as a single disputed claim term. Defendants propose a single construction (with alternative language) for all four limitations. TQD, however, proposes one construction for Limitation H and another construction (with alternative language) for Limitations I-K. For the reasons discussed below, the Court should adopt TQD's proposed constructions and reject Defendants' construction.

As an initial matter, Limitation H should be separated from Limitations I-K for purposes of construction because the language is not sufficiently similar to provide a single construction that is not subject to confusion. *See* A480-01 (Chrissan Decl.) at ¶ 60.

TQD's proposed constructions are correct because they are supported by, and are consistent with, the teachings of the specification. The specification explains that, when a transceiver is in "operation," it is performing data transmission or reception. *See* A481 (Chrissan Decl.) at ¶ 61; A7 (730 patent) at 5:52-55 ("It is thus desirable that the transceiver be able to suspend operations . . . when it is not needed for data transmission or reception . . . .") (emphasis added). The specification further explains that, when the transceiver goes from the state of active data transmission to a sleep mode, the transceiver stores its "state" in a memory. *See* A6 (730 patent) at 4:61-64;[86] A7 (730 patent) at 6:54-57;[87] A481 (Chrissan Decl.) at ¶ 61.

The specification lists the parameters related to a transceiver's "state" that are stored in the sleep mode. *See* A7 (730 patent) at 6:57-63 ("The state of the CO or CPE transceivers preferably includes at least the frequency and time-domain equalizer coefficients (FDQ; TDQ) and the echo-canceller coefficients (ECC) of its receiver portion and the gain of its transmitter portion; the transmission and reception data rates; the transmission and reception coding parameters; the-transmission fine gains; and the Bit Allocation Tables."). The listed parameters are protocol-specific parameters that are used for the transmission and/or reception of data over a communication channel. *See* A481 (Chrissan Decl.) at ¶ 61. Upon receiving an awaken signal, the transceiver "restor[es] its state" and "restor[es] power" and begins "transmitting immediately." A8 (730 patent) at 7:51-67.[88] The specification further explains that the state

[86] "Finally, a State Memory (SM) 36 connected to the controller 32 records the state of the transceiver for reasons discussed more fully below."

[87] "In pursuance of this, the CO transceiver stores its state in its own state memory corresponding to the state memory 36 of CPE transceiver 10."

[88] "In response to the 'Awaken' signal, the CPE transceiver retrieves its stored state from the state memory 38; restores full power to its circuitry; and restores the output of the FFT 56 to the input of the PLL 62 (step 96). The CO transceiver, on detecting the 'Exit Sleep Mode'

parameters are "required for reliable communications," *i.e.*, used for reliable transmission or reception of data. *See id*.; A481 (Chrissan Decl.) at ¶ 61.

Thus, given the specification's teachings about the "state parameters" and how they are used to transmit and/or receive data when the channel is in operation, Limitation H – "state parameters characteristic of the communications channel over which the transceiver is operating" – should be construed to mean "state parameters used by the transceiver for transmission and/or reception of data." *See* A481-82 (Chrissan Decl.) at ¶ 62.

Turning to Limitations I-K, a person of skill in the art would understand that the phrases "at least one parameter associated with" and "at least one parameter representative of" have no significant difference in meaning. *See* A482 (Chrissan Decl.) at ¶ 63. Indeed, the specification does not use the terms "associated" or "representative" in the context of describing the parameters. As discussed above, a person of skill in the art would also understand from the specification's list of parameters that the claimed parameters are used to transmit and receive data when the transceiver is in full power mode/operating mode. *See id*. Therefore, "at least one parameter representative of an operating mode" (Limitation I), "at least one parameter representative of a full power mode," (Limitation J), and "at least one parameter associated with the full power mode operation" (Limitation K) should be construed to mean "at least one parameter associated with the transmission and/or reception of data during [operating mode / full power mode]." *See id*.

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notification from the CPE transceiver (step 99), thereupon exits sleep mode by restoring its state and restoring power. On waking up from sleep mode, the CPE transceiver can begin transmitting immediately or after only a few frames delay, since it need not repeat the initialization that was earlier required to establish the requisite parameters (e.g., frequency and time-domain equalizer coefficients (FDQ; TDQ, echo-canceller coefficients (ECC), transmitter gains; transmission and reception data rates; transmission and reception coding parameters; transmission fine gains; and Bit Allocation Tables) required for reliable communications."

Defendants' proposed construction is incorrect for several reasons. First, as already discussed above, Limitation H should not be construed with Limitations I-K. Second, Defendants' construction is broad enough to potentially cover parameters that are not used for the transmission or reception of data. This would be inconsistent with the specification, which, as discussed above, specifically discloses storing only "state" parameters used for the transmission and/or reception of data. *See* A482 (Chrissan Decl.) at ¶ 64; *Renishaw*, 158 F.3d at 1250 (stating that a "construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction"). Lastly, Defendants' construction reads in the requirement that the parameter be "established by initialization." While the specification refers to the "initialization that was earlier required to establish the requisite parameters," *see* A8 (730 patent) at 7:61-62, nothing in the claims or specification requires importing that language into the claims. *See* A482 (Chrissan Decl.) at ¶ 64; *Johnson Worldwide Assocs. v. Zebco Corp.*, 175 F.3d 985, 989-90 (Fed. Cir. 1999) ("[C]laim terms cannot be narrowed by reference to the written description . . . unless the language of the claims invites reference to [it]."). Thus, the Court should reject Defendants' proposed construction.

2. Defendants' Answering Position

The parties' proposals share some overlap, but Plaintiff's lacks one key element: that the respective parameters are established by initialization. To not specify that the parameters are those that are "established by initialization" would broaden the claim beyond the scope of the invention of the Family 7 patents.

With regard to limitation H, Defendants agree that the state parameters are for the purpose of transmission and/or reception of data, but the construction of that term must also include that the transmission and/or reception parameters are *established by initialization*, as will be discussed

below. With regard to limitations I-K, the primary dispute is again whether the respective parameters must include parameters that were established by initialization.

The specification is clear that they must. The specification only discusses storing parameters that are established by initialization when the transceiver goes into sleep mode or low power mode. A19 ('753 patent) at 6:60–66 (disclosing that the state parameters "includes at least the frequency and time-domain equalizer coefficients (FDQ; TDQ) and the echo- canceller coefficients (ECC) of its receiver portion and the gain of its transmitter portion; the transmission and reception data rates; the transmission and reception coding parameters; the transmission fine gains; and the Bit Allocation Tables"); A20 ('753 patent) at 7:24–33. Then, when the transceiver comes out of sleep mode, "it need not repeat the initialization that was earlier required to establish the requisite parameters" because they are already stored. *Id.* at 7:62–8:3. Therefore, storing (when in sleep mode or low power mode) the parameters that are established by initialization and then using them to return to full power mode or operating mode *without reinitialization* is a central premise of the invention. A513-14(Heegard Decl.) at ¶¶ 65–66.

Thus, Defendants' construction does not import a limitation because the invention of the Family 7 patents requires that the parameters be established by initialization. The patent is titled "Multicarrier Transmission System with Low Power Sleep Mode and Rapid-On Capability." The system achieves "rapid-on capability" because reinitialization need not occur when the transceiver comes out of low power or sleep mode. *Id.*

This defeats the point of the claimed invention.

3. Plaintiff's Reply Position

Defendants do not respond any of the arguments TQD previously made with respect to these limitations except the argument that they should not be construed to include the requirement "established by initialization." That response is lacking. To start with, Defendants

argue that not adding "established by initialization" to the limitations will "broaden" the claims. *Supra* at 128. It goes without saying, however, that a claim cannot be "broadened" by not including language the limitation does not recite in the first place. Indeed, another and more accurate way to look at the situation here is that Defendants are improperly narrowing the claims by adding a requirement that is not found anywhere in the claim language. *See* A554 (Chrissan Reply Decl.) at ¶ 30.

Defendants further argue that their construction is correct because the specification discusses storing only parameters that are established by initialization when the transceiver goes into sleep mode and using those to return to full power mode without reinitialization. *Supra* at 129. This argument is not an accurate characterization of the specification's teachings.

First, the specification says that, when a transceiver goes into sleep mode, the transceiver stores its state (which can include a number of different transmission parameters) in its memory. A19 (753 patent) at 6:60-67; A20 (753 patent) at 7:24-33. The specification does not state that those parameters are identical to those established when the transceiver first initialized; rather, they are the parameters related to the state of the transceiver at the time it goes into the sleep mode. *See* A554 (Chrissan Reply Decl.) at ¶ 31. The values of the parameters, such as bit and gain parameters and frequency domain and time domain equalizers, can change while transceivers are transmitting and receiving data in full power mode due to distortions to the line. *Id*.; A17 (753 patent) at 2:4-28.[89] As such, a POSA reading the specification would understand

[89] "The number of bits carried by a symbol is dependent on the characteristics of the subchannel over which it is to be transmitted. . . . The principal determinant is the signal-to-noise ratio of the subchannel. Accordingly, this parameter is measured from time to time in order to ascertain its value for each subchannel, and thus determine the number of bits to be transmitted on the particular subchannel at a given time. The telephone channel is subject to a number of impairments which must be compensated for in order to ensure reliable transmission. Phase

that the parameters that are stored when a transceiver goes into sleep mode are not necessarily identical to the parameters that were established at initialization. A554 (Chrissan Reply Decl.) at ¶ 31.

Second, even if Defendants are correct in their understanding that the transceiver disclosed in the specification stores only the same parameters that were established by initialization – which they are not – it still is not proper to read that requirement into the claims. The claims are not written so narrowly, and "limitations may not be read into a claim from a preferred embodiment when the claim language is broader than that embodiment." *Resonate*, 338 F.3d at 1367; *see also Johnson Worldwide Assocs. v. Zebco Corp.*, 175 F.3d 985, 989-90 (Fed. Cir. 1999) ("[C]laim terms cannot be narrowed by reference to the written description . . . unless the language of the claims invites reference to [it].").

4. Defendants' Sur-Reply Position

Defendants are not impermissibly narrowing the claims by requiring that the respective parameters of these limitations be established by initialization. They are construing the claims in light of the intrinsic record, as the law requires. "[T]he claims cannot be of broader scope than the invention that is set forth in the specification." *Gemalto SA v. HTC Corp.*, 754 F.3d 1364, 1369 (Fed. Cir. 2014). The purpose of the invention is to restore parameters for rapid resumption of transmission after sleep mode, and the claims should be read in that manner. *See id.* ("The

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(delay) distortion of the transmitted signal is typically the most limiting of these impairments. This distortion is frequency-dependent, and thus components of a signal at different frequencies are shifted by varying amounts, thereby distorting the signal and increasing the likelihood of erroneous detection unless provision is made to combat it. To this end, frequency domain equalizers (FDQ) and time domain equalizers (TDQ) are commonly incorporated into the transmission channel in order to equalize the phase (time) delay across the channel frequency band. Other impairments also exist. For example, frequency-dependent signal attenuation adversely affects signal transmission on the telephone line. This is compensated by the use of gain equalizers on the line, while echo on the line is handled by the use of echo cancellers."

specification demonstrates that external memory storage was a defining feature of prior art Java technology, and that the patented invention was designed to eliminate the need for such external storage."); *Hockerson-Halberstadt, Inc. v. Avia Grp. Int'l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000) (citing *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998) for the proposition that "a claim interpretation that aligns with the purpose of the invention is likely to be correct"). Likewise, during prosecution of the '753 patent, the examiner rejected the claims over certain prior art. A452–A453 (U.S. App. No. 12/615,946, Non-Final Rejection, Aug. 6, 2010, at 2–3). In response, the applicants amended the claims to include specific state parameters that are established by initialization to overcome the cited prior art. *See* A457 (U.S. App. No. 12615946, Response to Office Action, Feb. 7, 2011, p.2 (Amended Claim 1: "wherein the state parameters include one or more parameters selected from the group comprising frequency-domain equalizer coefficients, time-domain equalizer coefficients, echo canceller coefficients, bit allocations, coding parameters, fine gains, and subchannel gains.")).

Plaintiff argues the state parameters "can include a number of different transmission parameters," *supra* at 130; however, the specification only discloses initialization parameters. *See* A514 (Heegard Decl.) at ¶ 66. Moreover, Defendants' construction does not exclude other parameters. It simply requires, consistent with the specification's description of the operation of the invention and the purpose of the invention, that a parameter established by initialization is included. The specification explains that the transceiver "need not repeat the initialization that was earlier required to establish the requisite parameters." A8 ('730 patent) at 7:60–62. Each embodiment of the specification focuses on rapid resumption of transmission and the purpose of the invention is to rapidly resume transmission upon wakening from sleep mode.

Thus, the specification plainly requires that the parameters be stored so that reinitialization is not required. Plaintiff also suggests that Defendants' construction requires storing the exact value of the parameter(s) that is established at initialization. *Supra* at 130. Defendants' construction does not state or require that the values of the parameters be unchanged (or changed), but only requires that the parameter(s) established by initialization be included.

L. "restore the full power mode by using the at least one parameter and without needing to reinitialize the transceiver" (recited in the asserted claims of the 404 patent)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning	"restores the transceiver to full power mode by retrieving and using the at least one parameter without needing to reinitialize the transceiver"

1. Plaintiff's Opening Position

The language of this limitation is clear. It does not need any construction and should be given its plain and ordinary meaning. *See* A483 (Chrissan Decl.) at ¶ 65.

Defendants' construction generally follows the language of the limitation but adds a few unnecessary and unrecited requirements. First, Defendants change "restore the full power mode" to "restores the transceiver to full power mode." There is no reason to change the tense of "restore." There is also no reason to add the reference to the "transceiver." Those changes by Defendants do nothing but add confusion to unambiguous language. Second, Defendants change the phrase from "by using the at least one parameter" to "by retrieving and using the at least one parameter." In doing so, Defendants improperly insert an additional step into the claim language. There is nothing in the claim language or the intrinsic record that requires reading the extra step of "retrieving" into this limitation. *See id*. at ¶ 66. As such, the Court should reject Defendants' construction. *See Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 950 (Fed. Cir.

1993) ("It is improper for a court to add 'extraneous' limitations to a claim, that is, limitations added wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim.") (quoting *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988)).

2. Defendants' Answering Position

Defendants' construction clarifies that "using" as a POSA would understand within the context of the patent, means retrieving and then using the parameter. The "at least one parameter" has been stored. A44 ('404 patent) at claims 1 and 6. Retrieving the parameter through the cited "recovering" or "restoring" is the only way the parameters are able to be used for the claim language as a whole to have meaning and to be consistent with the specification. A43 ('404 patent) at 7:64–66 ("In response to the 'Awaken' signal, the CPE transceiver retrieves its stored state from the state memory 38 . . . ."); A515 (Heegard Decl.) at ¶ 68. The specification does not disclose any way to "use" the parameter upon awakening without retrieving it from storage. Not clarifying that the parameter must be retrieved to be accessible for use could open the claim to different uses of the parameter that were not disclosed in the specification and render the claim language as a whole meaningless. *Id.* Therefore, this limitation should be construed as "restores the transceiver to full power mode by retrieving and using the at least one parameter without needing to reinitialize the transceiver."

3. Plaintiff's Reply Position

Defendants' construction must be rejected because there is no reason to read the word "retrieving" into the limitation. Defendants argue that "retrieving" the parameter is the only way the parameter is able to be "used." *Supra* at 134. However, the limitation is not directed to <u>what allows</u> the parameter to be used, only that it is used. Thus, Defendants' construction reads an

unnecessary and narrowing requirement into the claims. *See* A555 (Chrissan Reply Decl.) at ¶ 32.

Defendants further argue that the specification does not disclose a way to "use" the parameter without retrieving it from storage and that not clarifying that the parameter must be retrieved for use could open the claim to cover uses of the parameter not disclosed in the specification. *Supra* at 134. These arguments likewise miss the mark. A POSA would understand that the parameters are "used" to restore full power mode in the same way they are "used" to go from the original initialization process to full power mode. A555 (Chrissan Reply Decl.) at ¶ 32. For example, a POSA would know that a bit allocation parameter can be "used" to allocate the appropriate number of bits to each subchannel for purposes of transmission. *Id.* Thus, a POSA's understanding of how a parameter is "used" does not depend on whether the parameter is "retrieved" or not. Consequently, Defendants' construction does not truly seek to "clarify" "use" but instead seeks to add the unnecessary step of "retrieval" to the claim language.

Lastly, Defendants' concern that the claim could cover uses not disclosed in the specification is not valid at least because the law is clear that claims can cover more than the embodiments described in the patent. *See Virginia Panel*, 133 F.3d 860 at 866 ("[I]t is well-settled that device claims are not limited to devices which operate precisely as the embodiments described in detail in the patent."); *i4i Ltd. P'ship v. Microsoft Corp.*, 598 F.3d 831, 843 (Fed. Cir. 2010) ("[A] claim is not limited to the embodiments described in the specification unless the patentee has demonstrated a 'clear intention' to limit the claim's scope with 'words or expressions of manifest exclusion or restriction.'"); *see also* A555-56 (Chrissan Reply Decl.) at ¶ 33.

4. Defendants' Sur-Reply Position

In order to "use" the parameter, the parameter must be obtained in some manner. ADTRAN's construction clarifies that "using" as a POSA would understand within the context of the patent, means retrieving and then using the parameter.

Plaintiff cites two cases for its broad construction that are inapposite. Defendants are not importing limitations from a particular embodiment. Instead, they are construing the phrase in light of the intrinsic record, as the law requires. In the context of the phrase "restore the full power mode by using the at least one parameter . . .," the specification is clear that restoring full power mode requires retrieving a stored parameter and then using it. A43 ('404 patent) at 7:64–8:13. Moreover, that the parameter is stored is required by the claims, A44 ('404 patent at claims 1 and 6), further confirming that it must be retrieved from where it was stored in order for it to be used. Retrieval is not an embodiment; it is necessary step in "restor[ing] the full power mode" in light of the claim language and specification.

Nothing in the cases cited by Plaintiff undermines that conclusion. In *Virginia Panel Corp. v. MAC Panel Co.*, the court concluded that "reciprocating" was not limited to linear motion when the support in the specification for that restriction was the *absence* of a figure depicting non-linear motion. 133 F.3d 860, 866 (Fed. Cir. 1997) ("MAC's reliance on the absence of a drawing describing the non-linear motion of a slide plate is similarly unsound, for it is well-settled that device claims are not limited to devices which operate precisely as the embodiments described in detail in the patent."). Similarly, in *i4i Ltd. Partnership v. Microsoft Corp.*, based on the intrinsic record the limitation in question was understood to be an advantage of the invention. 598 F.3d 831, 843–44 (Fed. Cir. 2010). Here, Defendants' construction is based not on absence of a countervailing example or a description of possible advantage of the

invention, but on the language of the claims and the positive recitation of how the invention operates.

Therefore, this limitation should be construed as "restores the transceiver to full power mode by retrieving and using the at least one parameter without needing to reinitialize the transceiver."

M. "recovering said at least one stored parameter from the memory" (recited in the asserted claims of the 730 patent)

N. "recovered parameter" (recited in the asserted claims of the 382 patent)

Plaintiff's Proposed Construction	Defendants' Proposed Construction
For Limitation M: "retrieving said at least one stored parameter from the memory" For Limitation N: "parameter that is retrieved"	For Limitation M: "retrieves the stored parameter from the memory" For Limitation N: "parameter that is retrieved from the memory"

1. Plaintiff's Opening Position

The parties generally agree that the term "recover" means "retrieve" in the context of Limitations M and N. The specification does not discuss "recovering" parameters, but it does explain that the CPE transceiver "retrieves its stored state from the state memory." A8 (730 patent) at 7:52-54. Therefore, in view of the clarification provided by the specification, "recovering said at least one stored parameter the memory" should be construed to mean "retrieving said at least one stored parameter from the memory" and "recovered parameter" should be construed to mean "parameter that is retrieved" as TQD proposes. *See* A483 (Chrissan Decl.) at ¶ 67.

Defendants construe "recover" to mean "retrieve" as well, but make other alterations to the claim limitations that are unnecessary and confusing. For example, with respect to Limitation M, Defendants change "recovering said at least one stored parameter" to "retrieves

the stored parameter." There is no reason to construe "recovering" to mean "retrieves" (instead of "retrieving") or to change "said at least one stored parameter" to "the stored parameter." With respect to Limitation N, Defendants add the phrase "from the memory." By doing so, Defendants are improperly reading an extra limitation into the claim term from the specification. There is nothing in the intrinsic record that would suggest that "from the memory" needs to be added to Limitation N. *See id*. at ¶ 68. In fact, the claims of the 382 patent do not recite a "memory," so there is not even antecedent basis for Defendants' added language. Thus, the Court should not adopt Defendants' proposed constructions for Limitations M and N.

2. Defendants' Answering Position

Defendants believe there is no material difference for limitation M, and thus to reduce the number of disputes will agree to Plaintiff's construction of M.

As to limitation N, while both parties agree that "recovered" means "retrieved" Defendants' construction for "recovered parameter" provides clarification that the parameter is retrieved from memory. A POSA would understand that the parameter must be retrieved from somewhere and including memory in the construction merely clarifies the simple fact that the parameter is recovered from memory. A516 (Heegard Decl.) at ¶ 71. The specification clearly and consistently calls for the parameter to be retrieved from state memory. A31 ('382 patent) at 7:61–63 ("In response to the 'Awaken' signal, the CPE transceiver retries its stored state from the state memory 38 . . . ."). It is unclear what other places the parameters could be stored according to the claim language and specification.

3. Plaintiff's Reply Position

Defendants have agreed to TQD's construction for Limitation M, but persist in reading the phrase "from the memory" into Limitation N. By doing so, Defendants again improperly read limitations from an embodiment into a claim term. Defendants contend this additional

language "provides clarification" that the parameter is recovered from memory. *Supra* at 138. Defendants' "clarification," however, adds a requirement to the claim language that the applicant clearly did not intend to include. With respect to limitation M (recited in the 730 patent), the applicant chose to recite "retrieving said . . . parameter *from the memory*," but with respect to Limitation N (recited in the related 382 patent), the same applicant specifically chose not to include "from the memory" after the phrase "parameter that is retrieved." Indeed, as TQD has previously pointed out, the term "memory" does not appear in any of the claims of the 382 patent. *See* A556 (Chrissan Reply Decl.) at ¶ 34.

Accordingly, there is a presumption that Limitation N is not supposed to include the language "from the memory," and Defendants do not point to anything in the intrinsic record that overcomes that presumption. *Karlin Tech. Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999) (the doctrine of claim differentiation "is ultimately based on the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope"); *Alstom Grid LLC v. Certified Measurement, LLC*, No. 15-72-LPS-CJB, 2016 U.S. Dist. LEXIS 101465, at *23 (D. Del. Aug. 3, 2016) ("[C]laim differentiation, may be applied between related patents."); *i4i Ltd.*, 598 F.3d at 843 ("None of the claims mention 'independent manipulation' of the mapped content and metacode map, an omission we find significant. Had the inventors intended this limitation, they could have drafted the claims to expressly include it.").

4. Defendants' Sur-Reply Position

Plaintiff wrongly asserts that "Defendants do not point to anything in the intrinsic record that overcomes [the presumption that Limitation N is not supposed to include the language 'from the memory']." *Supra* at 139. However, in Defendants' brief, Defendants explained that the specification discloses the parameters are retrieved from the state memory. *See supra* at 138

(citing A31 ('382 patent) at 7:61–63 ("In response to the 'Awaken' signal, the CPE transceiver retries its stored state from the state memory 38 . . . .")); A24 ('382 patent) at FIG. 1; A30 ('382 patent) at 5:9–11 ("Finally, a State Memory (SM) 36 connected to the controller 32 records the state of the transceiver for reasons discussed more fully below."); *Id.* at 6:64–66; A31 ('382 patent) at 7:32–33. Moreover, that the parameter is retrieved from the memory is grounded in the claim language. The plain meaning of recovered is that something is taken away and then restored. Thus, a "recovered" parameter must be stored somewhere and then retrieved from that location. In this context of the Family 7 patents, parameters are stored in and recovered from memory.

Plaintiff's cases regarding the *presumption* of claim differentiation cannot overcome the plain meaning of the word "recovered" and the specification's explanation that a parameter is recovered when it is retrieved from memory after being stored there.

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Respectfully submitted,

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